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9. ABSTRACT

The goal of this symposium was to produce information for AID use in developing strategies and plans for assisting natural resource development programs in the lesser developed countries. Key discussions focused on considering the impacts of possible development schemes in LDCs. Some excerpts from the summation and closing remarks: The discussions have emphasized the need to develop institutions within LDCs. That means having available in the LDCs people capable of handling the everyday problems of technology transfer. While many LDCs have classical universities of long and deep traditions, they are not the kind of schools, bureaucracies, agencies, and research institutes needed. Almost every group that formulated recommendations seemed to be basing them on the assumption that AID and each LDC should have an overall statement of goals or policies or strategies or plans, and that those should be and can be in agreement with each other. But this is not realistic; we need to recognize that fact of life. We in the U.S. seem to be expecting more of developing countries than we do of our own country. We expect multidisciplinary actions and cooperation between ministries and LDCs. But we do not even practice this concept in our own country. We talk about searching for the goals of rural populations and being responsive to them. This is illusory. There is no one set of goals in a country, no one set of values. We have to work through the governments. The group interaction methodology tested in this symposium has worked quite well; participants have interacted freely, intensely, and enthusiastically.

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A. I. D. PRE-STRATEGY FOR ENVIRONMENT AND NATURAL RESOURCES

Proceedings of A Symposium held on

March 21-24, 1976
Doubletree Inn
Tucson, Arizona

sponsored by

U. S. Department of State, Agency for International Development
Office of Science and Technology

Edited for Publication by
Patricia Paylore and Richard A. Haney, Jr.

Office of Arid Lands Studies
THE UNIVERSITY OF ARIZONA
Tucson, Arizona 85721

1976

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PREFACE

The U. S. Agency for International Development Office of Science and Technology introduced a new format for its Fourth Annual Symposium held March 21-24, 1976 at Tucson, Arizona, and hosted by the University of Arizona Office of Arid Lands Studies. Earlier symposia were held at Cornell University, Massachusetts Institute of Technology, and Georgia Institute of Technology.

Although originally designated a strategy symposium, it was finally entitled the "A.I.D. Pre-Strategy for Environment and Natural Resources Development Symposium." The change in designation was due in part to employing the new format, a structured group interaction process introduced into the traditional workshop procedures.

Symposium goals were to produce information for AID use in developing strategies and plans for assisting natural resource development programs in the Lesser Developed Countries (LDCs). Key to the discussions was consideration of assessing impacts of possible development schemes in LDCs.

Central to symposium activities were two background scoping papers commissioned before the discussions got underway. The first, "Gaps, Issues and Barriers in Natural Resources Development with a Focus on Water, Renewable and Non-Renewable Resources," provided foundation for two following periods of group activity called brainwriting and part of the innovative format. The first such session consisted of three groups to articulate "Gaps, Issues and Barriers in Natural Resources Development" and the second session called for three groups to identify "Alternative Approaches to Dealing with Natural Resources Development Issues, Including Preliminary Evaluation." In each session topics of water, renewable, and non-renewable resources were addressed by individual groups.

The second background scoping paper "Implications, Interactions and Impacts of Technology, Environment and Social Conditions on Natural Resources Development" provided a base for three groups to identify and structure "Categories of Interactions of Natural Resources Development with Technology, Environment and Social Conditions."

Considering these topics was a high-level multidisciplinary group of specialists from national, international and foreign governmental agencies and institutions of higher learning. A goal of the new procedural format was to facilitate both formal and informal interaction and information exchange among participants with such diverse academic and cultural backgrounds. The technique also generated some spirited exchanges.

David Malone, Associate Professor, Center for Technology and Administration, American University, Washington, D. C., brought the format to the symposium. His report on its effectiveness is appended as Appendix VI.

Participants responding to a questionnaire designed to assist Mr. Malone with his evaluation found the imaginative workshop approach to be valuable with respect to interaction and information exchange and most noted positively that the brainwriting methodology required total participation by persons in group activities.

Most objections, Malone notes, were founded in the problems of time and planning. He suggests that planning for next year's conference begin as soon as possible and be carried out as an integral part of routine OST activities. Other participant suggestions were that future conferences have more clearly defined goals and objectives, that well in advance of the conference participants be informed of its contents and procedures, and that more time be scheduled to allow for greater depth in discussions.

Most of the present document is derived from transcriptions of tape-recorded plenary sessions, not the brainwriting sessions. There were only two formal papers, the background scoping papers. Because of the limitations of the nonpersonalized recording system employed during the conference, some exchanges and information were lost. Similarly, there were some difficulties identifying participants during the question-answer-comment periods. Although very interesting, informative and relevant to the focus of the conference, lunch and dinner talks by Phillip Pierce, William Doyel, Ambassador Rudolfo Silva, Jose Lizarraga-Reyes and Patricia Paylore are not reproduced.

The University of Arizona was pleased to host the symposium, particularly because the direction of its general thrust was toward natural resources development, a field of considerable concern and one long researched at the University. The University wishes to extend its gratitude to OST Director Henry Arnold and his associates for symposium design, planning, and implementation assistance.

Jack D. Johnson, Director
Office of Arid Lands Studies
University of Arizona
Tucson, Arizona

INTRODUCTION

The purpose of this symposium is to provide guidelines to identify gaps in and issues concerned with the development of natural resources in developing countries, to examine their needs for exploration, assessment, and management of those natural resources. I should like to set the stage by describing some of AID's programs as differentiated from those of the Office of Science and Technology itself. AID's mandate from the Congress is to direct our attentions not only to the poor countries but to the poorest and least developed sections of those countries. The general guidelines as established by Congress dictate that we emphasize areas of effort in the rural sections, particularly those affecting the poor, and it is within these guidelines that we should like to conduct our discussions during this conference.

The Technical Assistance Bureau has a responsibility which differs from those of the regional bureaus, the latter being actually on the spot assessing the situation in the individual countries and tailoring programs to suit those needs. The Technical Assistance Bureau, on the other hand, has two major functions: one to support those regional bureaus and mission activities, the second to try to provide guidance and leadership for the future by examining the future potential of technologies and try to develop them so that they will support major areas of emphasis.

Because discussion of conditions in specific developing countries does lend some reality to our deliberations here, we need not exclude such specifics; nevertheless, there is need to talk together during the next two days in somewhat general worldwide terms about the problems of natural resources. The previous strategy meetings* have been designed to take advantage of the expertise of recipients of Office of Science and Technology 211(d) grants in the belief that such institutions can provide the new knowledge needed to support us in projecting our thinking ahead into the future.

In the broad context, natural resources, the subject of this fourth conference, should properly include food and water as well as energy, plus forests, but for convenience we are categorizing natural resources in sectors of water, renewable resources, and non-renewable resources.

In this time of population growth, perhaps uncontrolled growth in some areas, and the growing scarcity of natural resources, there is the inevitable conflict between short-term considerations of natural resources and long-term. We may well ask ourselves, for instance, if we can afford, as we sometimes seem to be doing, to use up all the petroleum resources of the world as

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* 1st (1973), Cornell: Science Policy; 2d (1974), MIT, Appropriate Technology; 3d (1975), Georgia Institute of Technology: Science and Technology in the Role of Energy in Rural Development.

rapidly as we can, often in ways for which they are not particularly suited. Another conflict is that between users and suppliers of natural resources, likewise inevitable and one that can only grow more tough.* The optimum solution for both users and suppliers obviously is cooperation, from which each will benefit more than from the action-counteraction-retaliation scenario that characterizes so much contemporary conflict.

For this conference, we have chosen to highlight the interaction between natural resources and three other pervasive elements in national development: environment, technology, and culture.

In connection with the first of these, environment, I should like to quote AID's policy:

> ... It is AID's policy to assist in strengthening the indigenous capabilities of developing countries to appreciate and evaluate the potential environmental effects of proposed development strategies and projects and to select, implement, and manage effective environmental protection measures ... [and] to ensure that the environmental consequences of proposed AID-financed activities are identified and considered by AID in collaboration with the host country prior to a final decision to proceed and that appropriate environmental safeguards are adopted.

A good policy, though difficult to carry out, perhaps, certainly in its total sense. But there is no denying that the use of natural resources and environmental impacts are inseparable, and part of our task here is to understand the interactions of these two elements so that optimum solutions will be apparent.

Beyond this, we need to find ways to involve those people upon whom the impact resolves in the planning and decision making of those necessary compromises between environmental impact and development, an especially difficult task for rural recipients of AID's assistance where literacy may be lower then in other sections of a particular country.

As a final comment relating to this first of our interactive elements, the environment, I wish to emphasize a point we tend to overlook, namely that almost all environmental considerations are global in nature.** Most environmental deterioration spreads, recognizing no political boundaries, as one type of degradation leads to another type.

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* see Masoravitch and Pestill's book, Mankind at the Turning Point.

** an idea discussed recently with Professor Yenasi Sachs in Paris who cited the case of the plains of northern India where rivers are silting up as a result of activities in neighboring Nepal where extensive deforestation of mountains initiates massive soil erosion.

When we come to the second of our interactive elements, technology, we may cite some examples of simple technology: a well-designed house built by local persons in Bangladesh at a cost of approximately $100; a glue factory in Ghana using banana skins; a 1-kilowatt solar-powered water pump in the Niger desert that provides enough water for a small community, including its cattle and donkeys.

And finally, our third interactive element, culture, demands recognition on our part of the inevitable impact of natural resources exploitation on a society, and the degree to which it is willing to accept such impact vis-a-vis possible benefits.

Within this framework, then, I believe we can have a successful conference by featuring group interaction among the experts who have come here from widely scattered regions of the developing world with varying experiences, ideas, and attitudes. It is our hope that the result will be a set of guidelines for our future activities.

Henry Arnold, Director
Office of Science and Technology
U. S. Agency for International Development
Washington, D. C.

SYMPOSIUM PROGRAM

Sunday, March 21, 1976

5:00 - 7:00 p.m. REGISTRATION, Lobby, Doubletree Inn

Monday, March 22

8:15 a.m. WELCOME
A. R. Kassander, Jr., Vice President for Research, University of Arizona

8:30 a.m. INTRODUCTION - PURPOSE AND FORMAT OF CONFERENCE
Henry A. Arnold, Director
Office of Science and Technology

9:00 a.m. BACKGROUND SCOPING PAPER: Gaps, Issues and Barriers in Natural Resources Development with a Focus on Water, Renewable and Non-renewable Resources
Helen Ingram, Department of Political Science, University of Arizona

W. Gerald Matlock, Department of Soils, Water & Engineering, University of Arizona

10:15 a.m. GROUP ACTIVITY: Three Groups to Articulate Gaps, Issues and Barriers in Natural Resources Development

I. WATER
Simon Ince, Rapporteur, Departments of Civil Engineering, and Hydrology and Water Resources University of Arizona

II. RENEWABLE RESOURCES
William Littlewood, Office of Science and Technology

III. NON-RENEWABLE RESOURCES
Walter Parham, Rapporteur, Office of Science and Technology

12:00 noon LUNCH

Address: Environmental Aspects of the Development of the Senegal River Basin
Phillip Pierce, U.S. Army Corps of Engineers

2:00 - 5:00 p.m. GROUP ACTIVITY: Three Groups to Identify Alternative Approaches to Dealing with Natural Resources Development Issues, Including Preliminary Evaluation

I. WATER
Simon Ince, Rapporteur

II. RENEWABLE RESOURCES
William Littlewood, Rapporteur

III. NON-RENEWABLE RESOURCES
Walter Parham, Rapporteur

5:00 p.m. THE RALI PROGRAM
William Doyel, Assistant Program Manager for Information Dissemination, Resource and Land Information Program, U. S. Geological Survey

7:00 p.m. DINNER ADDRESS
H. E. Rudolfo Silva
Ambassador of Costa Rica, Washington, D. C.

Tuesday, March 23

8:00 a.m. PLENARY SESSION: Reports from the Monday Working Groups and Discussion
Chairman: Robert Seale, Chairman, Natural Resources Program Management Committee, and Head, Department of Nuclear Engineering, University of Arizona

WATER: Simon Ince

RENEWABLE RESOURCES: William Littlewood

NON-RENEWABLE RESOURCES: Walter Parham

9:30 a.m. BACKGROUND SCOPING PAPER: Implications, Interactions and Impacts of Technology, Environment and Social Conditions on Natural Resources Development

I. TECHNOLOGY
W. Gerald Matlock, Rapporteur, Professor, Soils, Water and Engineering, University of Arizona

II. ENVIRONMENT
Molly Kux, Rapporteur, Office of Science and Technology

III. SOCIAL CONDITIONS
John Dettloff, Rapporteur, Research Associate, Institute of Government Research, University of Arizona

12 noon	LUNCH ADDRESS: Jose Lizarraga-Reyes, Director General, ONERN, Lima, Peru
2:00 - 5:00 p. m.	GROUP ACTIVITY: Cross Impact Analysis with Three Groups to Elaborate Details of Interactions of Natural Resources Development

I. TECHNOLOGY
W. Gerald Matlock, Rapporteur

II. ENVIRONMENT
Molly Kux, Rapporteur

III. SOCIAL CONDITIONS
John Dettloff, Rapporteur

Wednesday, March 24

9:00 a. m.	PLENARY SESSION: Reports from the Tuesday Working Groups and Discussion Chairman: Clark Bloom, Chairman, African Working Group, Natural Resources Program, and Head, Department of Public Administration, University of Arizona
	TECHNOLOGY: W. Gerald Matlock
	ENVIRONMENT: Molly Kux
	SOCIAL CONDITIONS: John Dettloff
12:00 noon	LUNCH ADDRESS: Deserts: An Etymological Anomaly Patricia Paylore, Assistant Director, Office of Arid Lands Studies, University of Arizona
2:00 p. m.	REJOINDER SESSION: By Authors of Scoping Papers Chairman: Robert Seale
	REJOINDER AND DISCUSSION: Scoping Paper I Helen Ingram W. Gerald Matlock
	REJOINDER AND DISCUSSION: Scoping Paper II Leonard Berry
4:15 p. m.	SUMMATION AND CLOSING Robert Seale Clark Bloom Henry Arnold

BACKGROUND SCOPING PAPER:

I. Gaps, Issues and Barriers in Natural Resources Development with a Focus on Water, Renewable and Non-Renewable Resources

Helen M. Ingram
Director, Institute of
Government Research
University of Arizona

W. Gerald Matlock
Department of Soils,
Water and Engineering,
University of Arizona

I. Introduction

Our charge in this scoping paper is to provide some perspective on the issues of natural resources development. The obvious first question is: what is a natural resource? We need first to distinguish between natural resources and other resources, the first being those that occur or can be found in nature apart from humans and human development. At the same time what can be considered a resource depends on human needs, the level of technology, and social attitudes. For example, natural gas has not always been a natural resource and still is not in many areas of the Middle East. In the United States its definition as a resource depends on high pressure pipeline technology and construction. In Saudi Arabia the usefulness of natural gas depends on the development of a market.

The chart we have prepared is intended more as an indication of the universal subject matter with which we are dealing than as a sophisticated conception. Some resources are universals to the extent that they are basic to human needs: land, water, air and sunshine. All other resources are derived from these.

A distinction is often made between renewable and non-renewable resources. The classification is more utilitarian than accurate. It separates the resources that are gone forever when used up from those which nature will replenish in time. At the same time it must be noted that the exhaustion of any natural resource in an absolute sense is unlikely. For example, we simply use a lower grade ore or recycle discarded wastes. Further, many non-renewable resources are substitutable while some so-called renewable resources can be permanently destroyed. Land degradation can be extended to an irreversible point, at least in practical terms. Around the globe there are numerous severely desertified areas which cannot be renewed at current cost-benefit ratios or levels of technology because of erosion, salinity, or fundamental changes in ground cover.

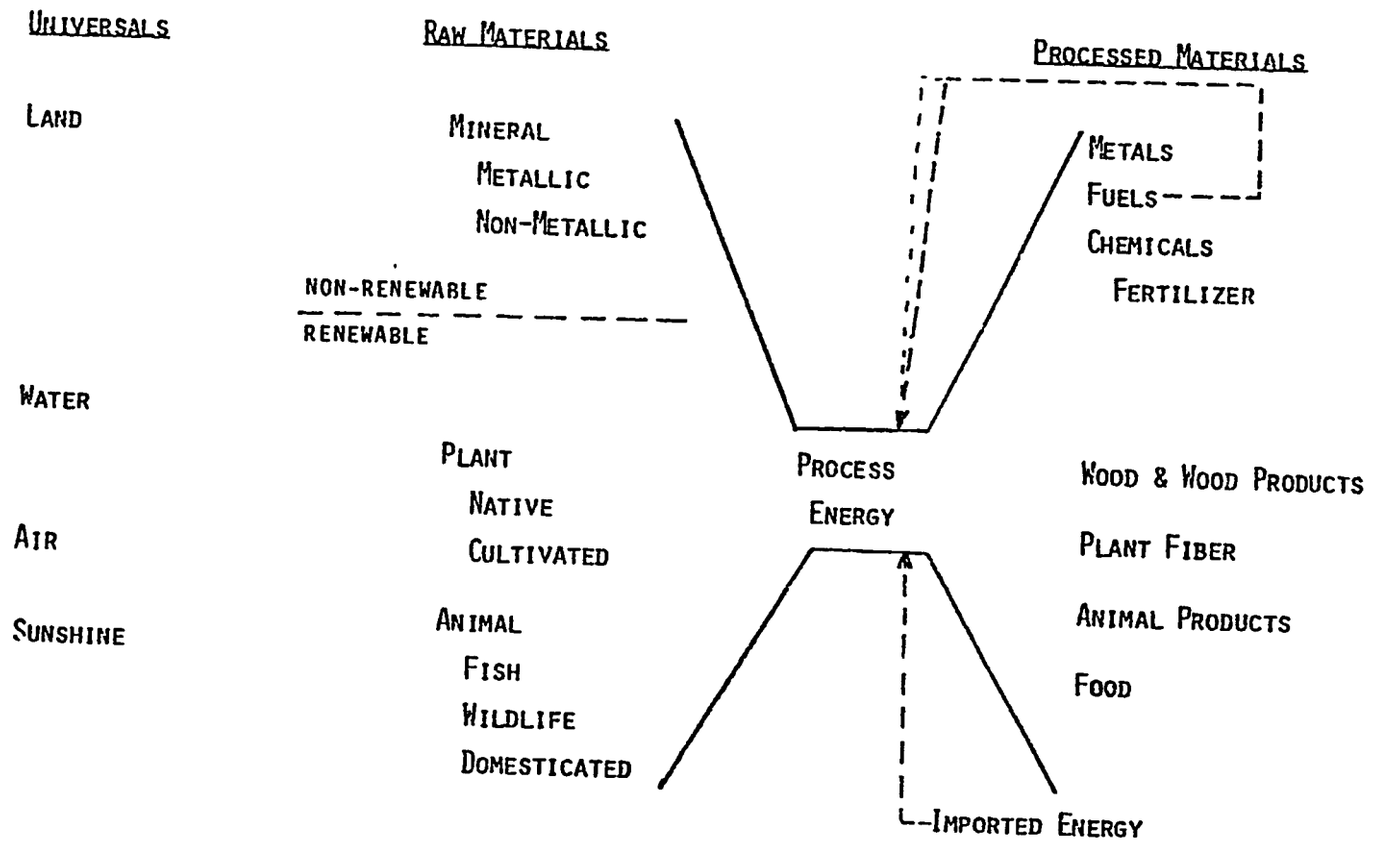
Two observations about our systems of natural resources development are in order.

- Natural resources development has traditionally been basic to economic development. A community must have a store of something, some surplus greater than itself consumes to serve as the basis of exchange.

There are a few examples of areas which have developed industrially through skilled labor, but this is not the predominant historic pattern. In practice, the development of resources has been the first step in the economic development process.

- Natural resource development traditionally has required the investment of significant quantities of energy.

NATURAL RESOURCES



Mineral extraction, for example, is an energy-intensive enterprise. Even agricultural development as it is now exported requires machines, fertilizers and petrochemical pesticides. In an age when energy is expensive, such requirements are important criteria for development.

II. Past, Present and Future

There are some important lessons to be learned from an historical perspective on resource development. Looking at the United States alone, the message is clear:

- We have made some serious mistakes in resource development.
- Although we continue to make them, we know much more now than we did when many of our earlier resource development mistakes were made.
- The future situation of worldwide resource shortages promises to make the repetition of our development mistake in LDCs fatal errors for them as well as us.

Let us turn first to a few examples of classical mistakes.

- Misjudging best use. Misguided economic policies have encouraged oil and gas markets overexpansion. As a result, our extensive coal resources were left underdeveloped. Precious petroleum and natural gas have been used to fire boilers and heat homes where other more plentiful fuels could have done the job. Now we have a huge investment in gas pipelines and gas burners. Now we are paying the costs of converting some equipment to burn coal at the same time we face the costs of coal gasification. Another example of misjuding best use was embodied in the Homestead Act. Intensive cultivation, expanded to marginal lands productive during wet cycles, led to the Great Dust Bowl when the inevitable droughts came. Crops were poor or nonexistent. Precious top soil, important to land productivity, was lost.

We now stand in danger of repeating the errors of the past. Intensive cultivation has returned to some of these areas even as we may be on the verge of another dry cycle.

- Ignoring environmental consequences. There are scores of examples. An Arizona horror story involves the Wellton-Mohawk Project. Following World War II, the federal government sponsored a project that provided Colorado River water to an area abandoned because of a buildup of salinity in the "recirculated" groundwater. The consequences of irrigating citrus in an area with sandy soil, high levels of salinity, and no natural drainage have been excessive water use and heavy salinity in return flows. Quality of the water we had promised under international treaty to deliver to Mexico was severely degraded. Currently we are planning a $155 million desalinization plant which still may not rectify the mistake.

- Ignoring social consequences. There are many examples of social dislocation through resource development. A potential example is the development of the Kaiparowits power plant in southern Utah. Small Mormon towns, which today approve of the plant because it will provide power for farms and keep children from migrating, may be overwhelmed by outsiders, with little appreciation for local lifestyles, who will be attracted by the plant to their communities.

In the past decade or so we have become much more sophisticated both in development technology and in predicting the consequences of natural resources development. We know about development methods which are more efficient and have fewer adverse consequences. There is little doubt about whether or not these methods should be applied to LDCs. Most analysts agree that natural resources of many kinds are becoming increasingly scarce. With an expanding world population they must be developed equitably and efficiently. The U. S. had great margins for error as it expanded. High grade mineral resources were skimmed off, leaving behind resources more difficult to recover. LDCs do not have that option, their needs being greater and their resource base likely to be smaller.

Further, environmental quality cannot be treated as a luxury which only the rich nations can afford. Inappropriate development programs could result in degraded resources and less healthy populations which would increase societal burdens. We can do a better job and we must. Accomplishment will depend on facing some of the following critical issues.

III. Development Issues

The following basic criteria should help us assess resources development viability.

- Physical Issues. Critical to development decisions are the questions: What are resources? What is their quality? And in what combinations do they occur? These questions lead to questions of assessment. Intellectually, resource assessment would seem to be the first step in development. At the same time assessment can be expensive and time consuming. Should the Libyans, for example, know precisely how much groundwater they have before they drill wells and develop settlements? On the one hand, a thorough assessment would reveal the expected long-term yield of the aquifer. Resettlement could be planned or other water supplies could be identified before wells run dry. On the other hand, a thorough assessment might postpone action indefinitely.

The next step in resource development following assessment logically would be a development plan which takes into account and mitigates environmental impacts. For example, in renewable natural resource development it would be rational to calculate "carrying capacity" in setting out a development plan. How many people, animals and crops can live on a given piece of land without ultimately degrading it and reducing its productivity?

Again, in planning development projects, the question is: how much knowledge is really useful? There are some absolute limits to information. We learn daily how much more we have yet to learn about ecosystems and the environment. (Freon from spray cans and emissions from the SST threaten the ozone layer; red dye #2 causes cancer, etc.) Some information is terribly expensive. Preparing environmental impact statements, United States Federal agencies have learned, is both costly and time consuming.

How much we really need to know about physical aspects of development is a question this conference should address. We have no answer except that it is a risk. When the risk is large and the consequences are irreversible greater effort should go into physical information gathering. When the potential danger promises to be either short-term or manageable, perhaps development can proceed on fragmentary information.

- Technical Issues. The technical requirements of resource development are a very significant limitation to resource development in LDCs. As our techniques become increasingly sophisticated, they become more difficult to transfer. In the past we have tried various ways to overcome technical gaps. None has been really successful.

  Sending experts abroad is not always a good means of technology transfer. They usually do not relate

to host country counterparts, tending to construct rather than instruct. When they leave, LDCs are left with facilities they may be unable to operate or maintain.

Educating foreign students in the United States has backfired in many ways. They sometimes resist returning home where conditions do not fit their expectations. Also, what they learn is often not applicable to homeland conditions where computer facilities, for example, may be rare.

This conference should deal with technology transfer issues. There is much discussion about intermediate technology. While it may be useful, it too has problems. Intermediate technology will not produce in the large-scale, impressive development projects which many LDC governments want.

- The Time Issue. While time and timing are important considerations in any development, they are crucial in natural resources development. Typically, resource development takes a long time. The average time for a U.S. Corps of Engineers water project to go from the idea stage to the construction stage is more than a decade. LDC politicians often need quick solutions to living standard and employment problems which natural resource development usually cannot deliver. Also, it takes a long time to determine whether or not a natural resource development project has been successful. Even when increased yields are obvious fairly early, an agricultural project cannot be said to really have achieved its goal unless the higher yields are sustained.

  Time is important also in determining adverse consequences. Short-term gains may lead to long-term productivity losses. Irrigated agriculture may do well for a decade until salt levels build up and adversely affect crops. A new reservoir may increase and stabilize water availability downstream until it silts in and its banks become choked with phreatophytes.

  The time issue is a question of short- versus long-term gains. Need LDCs suffer the many adverse long-term consequences of resource development we have borne? Perhaps if technology does not transfer well, neither do lessons learned from its application.

- The Economic Issues. The economic questions in resource development are obviously important and terribly complex.

Whether or not development is viable depends on production costs, demand and markets, rate of return and other factors. Here are a few fundamental, emotionally charged issues we should identify:

.. Availability of development capital. Resource development--especially of minerals, energy and, water--trends to be highly capital-intensive. Capital is increasingly scarce. Should it be invested only in areas where the rate of return is likely to be high?

.. Source of development capital. The source of development capital is an increasingly sensitive issue. Many LDCs have come to feel that development capital from a powerful nation spells economic subservience. Is this true? If not, what can be done to change LDC perceptions? The World Bank is often perceived as dominated by the United States. Is the United Nations an alternative?

. Social and Governmental Issues. Resource development in LDCs is bound to help some people more than others. It may actually impose hardships on some, resettling them from reservoir areas or moving them to new towns. Should social equity be one of the goals of resource development? If it is, can it possibly succeed if the elite of a country is not committed to the redistribution of wealth?

The role of women in development is a very important social question. For example, in many West African nations, despite the fact that women provide 75 percent of agricultural marketing labor, they play a small role in establishing development policy.

The capability of governments to implement development policies is another great issue. Our agricultural development depended upon a highly skilled researcher cadre and agricultural extension agents anxious to perform well in the field. Many LDC bureaucracies, inherited from more status-conscious European cultures, prefer desk work and avoid contact with peasants. Beyond these social barriers there are problems of budget, personnel and training.

IV. Conclusion

Our purpose in this scoping paper has been to point to the realities and to raise some important issues. We regret if rationality, although a reasonable goal for a conference, has been made to sound too easy. Albert Hirschman has described "the principle of the hiding hand" which governs many resource developments. Human creativity, according to Hirschman, while usually unanticipated and underestimated, may be the most important ingredient in resource development. "... each project comes into the world accompanied by two sets of partially or wholly offsetting potential developments: 1) a set of possible and unsuspected threats to its profitability and existence, and 2) a set of unsuspected remedial actions which can be taken whenever any of these threats materializes. "* There are, therefore, real advantages in not trying to be too rational and plan for everything. Hirschman goes on, "If the project planners had known in advance all the difficulties and troubles that were lying in store for the project, they probably would never have touched it, because a gloomy view would have been taken of the country's ability to overcome these difficulties by calling into play political, administrative, or technical creativity." Hirschman continues, "In some, though not all, of these cases advance knowledge of these difficulties would therefore have been unfortunate, for the difficulties and the ensuing search for solutions set in motion a train of events which not only rescued the project, but often made it particularly valuable." He concludes, "Creativity always comes as a surprise to us: therefore we can never count on it and we dare not believe in it until it has happened. In other words, we would not consciously engage upon tasks whose success clearly requires that creativity be forthcoming. Hence, the only way in which we can bring our creative resources fully into play is by misjudging the nature of the task, by presenting it to ourselves as more routine, simple, undemanding of genuine creativity than it will turn out to be." We may take heart in thinking that what we lack in a rational natural resource planning scheme can be supplied in the end, only by human imagination. Surely replenishing the store of ideas from which creativity springs is the major goal of this meeting.

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* Albert O. Hirschman (1967). The Principle of the Hiding Hand. The Public Interest, No. 6 (Winter '67), p. 10-23.

DISCUSSION

W. G. Matlock: Dr. Ingram has given you our ideas on the issues that face this conference and the topics we think are important for group discussion. One of the issues was what Albert Hirschman has described as the principle of the hiding hand which governs many resource developments. We know that while human creativity is usually not anticipated or estimated at the correct level, it is, perhaps, the most important ingredient in resource development.

Comment: Dr. Ingram said that there was conflict between the length of time required for natural resource development and the need of most politicians in a country to do something. Myself, I would say simply that that ought to be extended to politicians in this country.

Comment: We have a process of evaluation in AID that says you have to produce some valuable identifiable results.

Matlock: Agreed. Certainly as we look at what has to take place in natural resource development we see this dilemma. It makes no difference whether it is a project to build a dam, construct an irrigation system, or a program in rangeland recovery. These processes take a great deal of time. This is particularly true as we address the issues of natural resource development in arid and semiarid areas.

For instance, we do not even know how long it is going to take for rangeland recovery under certain arid climate conditions. We do know that here in Arizona range management programs may take a generation before we know whether there has been any impact on the situation. Even with our capability in the United States to deliver technology, coupled with our basic educational systems and vast personnel, monetary and physical resources, we have not done a very good job. Where these situations are extant in developing countries, it behooves us to put our best efforts to bear on reaching recipient populations. It is certainly a serious problems.

Comment: I think many of our problems have been self-inflicted through inadequate or improper economic and environmental analyses. The two are very related.

Matlock: There is no question that we face these problems every day in this country in large-scale natural resources development projects. The controversy that I can most quickly point to here in Arizona concerns the Central Arizona Project, basically a scheme for Arizona to use its entitlement to Colorado River water by bringing it to the central part of the state. There are certainly some invisible economics in that project. Perhaps because of the vastness of the resources of this country, we can afford to make some of these mistakes. But in the developing countries where resources are more limited, both physical and capital, and where the overall economic bases of those countries are so much more limited, making mistakes sets up a situation much more serious, more critical, than the same mistakes made here at home.

Comment: Your last observation points out to me the necessity of building substantial research and evaluation performances for every major project. In Afghanistan, for instance, there is no data, so if you are going into a major development, especially a rural one, you have to have some basis of measuring what you are doing as you go because there is no way of telling or predicting in advance.

Comment [Arnold]: I find nothing in the paper put together by the University of Arizona staff to take issue with, but I do want to question Hirschman's conclusion that we should not consciously engage in tasks the success of which requires that creativity be forthcoming. I think we already have engaged in such tasks. I would say that nobody who started on the task of going to the moon thought there would not be creativity required before that task could be accomplished. More important, I think it should not be a deterrent. We should recognize that in future, while there will be many tasks whose procedures we cannot see clearly, we should tackle them, nevertheless. Problems of resources, of food, and of development in general, I think, clearly fall into that category.

Matlock: Perhaps Hirschman's comment may have been somewhat tongue-in-cheek. It may be true that you cannot actually anticipate creativity, yet we know that if we bring enough human resources to bear on problems, creativity does result. Even though we certainly are limited in our ability to analyze all the features of it as we start a project, nonetheless we do have to move.

Comment: I think it is absolutely opposite. I agree with Arnold. If we could not depend on creativity, we should never have started on something like the cancer program.

Matlock: Perhaps it is only a question of semantics.

Comment: But this is another conflict in that sometimes we have gone overboard with the idea that science will always find a way.

Matlock: Agreed. To return to the issue of time in natural resource development: It takes time to train people whether you train them locally or in another country. Frequently natural resource development projects end before training has been completed. People may have an education but have not been exposed to project activities in their own countries. They do not have time to get that on-the-job experience so essential to the continuing success of a project.

Comment [Cox]: We ought not be too absolute in some of these instances. Whether programs work or not, there may be almost as many disadvantages to the former, where they have worked, as where they did not, so we should be informed of the problems. We should not get the idea, for example, that most people trained in the United States stay here. Many trained here or in Europe do go back to their own countries. They also find productive work many times somewhere else. The idea that resources are very limited overseas and not limited here--that we are a wealthy country--many times is wrong and the situation is exactly the reverse. In most countries where we have worked, they have more men per capita than we do as far as productive potential is concerned.

BACKGROUND SCOPING PAPER:

II. Implications, Interactions, and Impacts on Technology, Environment, and Social Conditions On Natural Resources Development

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Introduction

In the past few years, the world picture has been changing rapidly in complex ways. New thoughts about development, new emphasis on environmental concerns, new technology impacts have all taken place against a backdrop of a world in transition. There are new elements of economic forces and new pressures for structural change. It is not very practical to review all that in one short paper. Instead I will address the question, "What is the impact of these sets of forces on natural resource development and international assistance for such development," first sketching some of the more important changes then outlining some current thinking on the potential impact of those changes on natural resource development, and finally making some suggestions about where this might lead us in international aid and development programs generally.

The USAID definition of natural resources is:

> "Natural resources include natural products (e. g. minerals, forests, fish, water) and amenities or situations (e. g. waterfalls, waterways, fertile soils, mountains) which are assigned value by man as a result of their potential economic or social benefits."

Natural resources utilization ranges from food gathering in some societies to complex mining, lumbering, and agricultural enterprises in others. In this wide range of enterprises, natural resources use is fitted into societal systems, each with its particular techniques. In each case there is an environmental impact, great or small. Use of technologies across societal systems is widespread and environmental impacts of both "traditional" and "modern" technology appear to become more important, or at least more perceptible. Although we might talk about technology, environment and social conditions as separate issues, the impact of change in each of these three areas has clear repercussions in each of the other two. In a changing world the feed-back between different sectors may be as important as events within each sector.

Social Conditions

Changes in social conditions and viewpoints towards development provide the framework in the short run within which to look at technology impacts on the environment.

The decade of emphasis on national growth in terms of GNP has passed uneasily into a period when other goals are emphasized. The rhetoric that development programs and development aid should be focussed on the need for "Redistribution with Growth" is now widely accepted. We hear it clearly in the pronouncements of the World Bank, the Congressional mandate to AID and in the five-year plans of developing countries.

The economically disadvantaged populations of most developing countries are found largely in the countryside which leads to concern for rural development

and improvement in the quality of rural life. Changes come about usually only through changes in natural resources use patterns and efficiencies within the the country concerned--forests and woodlands, agricultural soils, and water. Given this emphasis, much thought has to be given to the most effective ways of keeping wealth in the countryside once it is generated. What kinds of natural resources developments can provide the most effective and wide income distribution in rural areas?

Changes in Technology

Two separate and opposing trends characterize technology. First is the explosive increase in technical systems sophistication and variety. Second is the increasing awareness of the need for "technology with a human face"--intermediate technology.

Impacts in developing countries of new data collection systems have been greater during recent years than new natural resource extraction and processing systems. New data collection systems impacts have widespread and far reaching implications in development and development aid.

For example, the advent of ERTS/LANDSAT satellite imagery and digital output has provided a flood of new natural resource information. Many LDCs are beginning to incorporate this technology into their national collection and analysis systems. How does this affect possibilities for natural resource development? Does it conflict with the demand for intermediate technology as most appropriate for LDC growth and internal income distribution? The technology is exciting and cheap, if only image and tape costs are calculated.

How countries respond to technology depends in part on their perception of national resource data needs. Natural resource data needs obviously vary in relation to the degree of sophistication of data-user systems and types of natural resources endowments involved. The degree of central planning favored by the government concerned also is important. Most LDCs have inherited some elements of natural resource data gathering systems from colonial periods. A mix of development, natural resource, political and historical factors thus leads to diversity of national and regional circumstances.

Data needs perception is strongly related to individual training and outlook A politician may judge intuitively the most effective development action and wish to short-cut the data gathering process favored by the rational planner. Indeed, big national resources decisions are often made in the political arena even though most governments have well articulated natural resource data collection services scattered through a number of ministries or departments--geological surveys, social surveys, topographic surveys, forest surveys, climatological and meteorological services and the like.

The tasks of each of these services can be defined in very different ways. However, it has been traditional to include survey components in most.

Surveys of ever-changing phenomena such as weather or water flow are monitoring or time-sampling processes; surveys of soils and ecology are predominantly areal mapping processes.

There has been a strong tendency to develop an inventory approach to data gathering by these services, especially those where areal mapping is important. Priority conflicts can thus arise. A soil survey may plan to systematically map the country and wish to complete a mapping overview as a high priority, while scattered development projects in different parts of the country may urgently need detailed soil surveys. Remote sensing techniques greatly assist overview surveys and may help resolve such conflicts. It is important to have the big picture. It is equally vital to be able to focus scarce resources on individual detailed studies that will benefit current development efforts. Remote sensing may allow both to be possible.

Major sampling problems arise in data gathering approaches to fluctuating resources. Even in the best circumstances, for instance, samples of climatic conditions and river flow are limited. Problems exist in extrapolating such data to wider areas. Remote sensing can provide a vital function in dealing with this kind of problem.

The U. N. Conference on the Environment and drought and attendant environmental deterioration in parts of the world are two events which have brought about some changes in emphasis during the past five years, including greatly increased natural systems monitoring. Needs for monitoring atmospheric pollution trends, oceanic changes and changes in soil status and vegetation now are more appreciated. Nations are becoming aware of the need to monitor change within their territories, creating a new need for data. In many areas weather change patterns during the last few years have spotlighted the areas' vulnerability to gradual ecological deterioration and consequent massive productivity losses in dry periods. Thus some nations want better data on changes in areal conditions--land cover and patterns of human occupance of affected areas.

There is also value in data which rapidly identified the effects of man-land relationships in rural areas with growing populations. But information systems have not adapted yet to these new needs either on national or global scales.

Early warning systems can be instituted at subnational, national or regional levels which can demand the best environmental information for predictive successes. Scale would dictate the mix of environmental information sources appropriate to the trend under study. Currently few institutions exist to monitor changes this way but these activities warrant integrating national scientific agencies. For example, the possibility is currently being examined of integrating scientific information related to climate and soil moisture conditions, crop yield projections and local crop forecasting data to form a basis for food shortage early warning systems.

Many aspects of natural resource data also involve human resources information. A major concern of development programs over the last fifteen years has been the weight placed on natural resource data in comparison with human resource data. Many unanswered questions relate to the role of remote sensing in this area.

Thus an early priority for many governments is creating new data-flow mechanisms which more effectively integrate information. It is possible for remote sensing to act as a catalyst in these changes.

Natural resource information is of little use by itself. Integration of overview remote sensing information with ground truth therefore becomes a high priority. High-level remote sensing technology fortunately can be counterbalanced with high-level on-the-ground involvement of local people. Different sets of information thus can be brought together coherently (Table I).

Remote sensing systems can identify forest and water resources, soils and mineral resources on national or regional bases these data then can be utilized at local levels using appropriate local technology and participation.

It is this particular use of technology, appropriate to each stage of an LDC activity, that may provide distinctive and helpful resource use patterns in the coming years.

Changes in Perspective on Environmental Issues

Changes in viewpoints about environmental issues in the last few years have been a result of a number of different forces but increased political awareness of the problems, increased impact of climatic fluctuations, and increased understanding of the need for growth in world food production are the most important.

New dimensions of international political awareness were first emphasized in the Stockholm Conference just a few years ago. Since then UNEP has been established and debate continues on pollution and other issues in national and international forums.

At the same time climatic fluctuation, or as some would say climatic change, has created severe environmental problems in many parts of the world. The Sahel, East Africa, and Ethiopia have all suffered severe droughts. Large areas in these countries have undergone environmental deterioration. The difficulties of feeding growing populations have been brought home to many countries by unfavorable climatic impacts and have led to a new awareness, at least in some quarters, of the importance of maintaining and increasing production in rural areas.

Results of increased attention to environmental problems are difficult to chart. International studies and debates have certainly increased. Some political action in certain LDCs has emphasized the problems. In a few

TABLE I

NATURAL RESOURCES INFORMATION

	Data Type	Data Output Forms	Data Base Types	Relative Availability	Type of Organization Used to Collect Data
Geological	Static	Maps, Reports	Photos, Survey	XXXX	Government
Topo-mapping	Static	Maps	ERTS, Survey Photos	XXXXX	Government
Terrain	Static	Maps, Reports	Photo, Survey	X	University, Team
Vegetation Cover	Changing	Maps, Reports, Photos	Photos, Transect ERTS	XX	University, Team
Land Use	Changing	Maps, Reports	Photos, ERTS	X	University
Soils	Static	Maps, Reports	Photos, ERTS Survey	X	Government
Soil Erosion	Dynamic	Statistics, Reports	Isolated Studies	(X)	University
Water Movement (Hydrology)	Dynamic	Statistics, Reports	Recordings, Estimates	XXX	Government
Other Process Geomorphology	Dynamic	Statistics, Reports	Isolated Studies	(X)	University
Climatic System	Dynamic	Maps, Reports	Recordings, Remote Sensing Data, Surrogate	XX	Government
Eco-system	Static, Changing	Maps, System Diagrams	Photos, Remote Sensing, Isolated ERTS Studies	X	University
Total Regional System	Static	Maps, Imagery	Economic, ERTS	(X)	University, Team

Key: XXXXX National Cover
(X) Very Local
7 Point Scale

countries governmental bodies have been set up to coordinate action on such problems. Food production problems generally have been given more attention.

An idea of where some LDCs are in this respect can be obtained from an assessment Bob Kates and I developed. It is outlined in Table II which was drawn up for East Africa but has general application to much of Africa south of the Sahara. The categories in the table still appear to be the most appropriate but population growth now appears to be more important than it was a few years ago. The impact of increasing demands by more people on a stressed environment is growing rapidly. Soil and topographic deterioration is quite widespread. In parts of Kenya and Sudan, for example, deterioration reaches serious proportions. But recent studies show that at least in Tanzania farmers view animal and bird pests as their most serious problem. The wild pig is high on many peasants' enemy list. It is believed that it causes more damage to crops even than the quela bird and elephant. The menace of animal pests both during the growing season and after harvest is well appreciated by farmers but is placed low on most assistance priority agendas. The extensive contact zone between cultivation and natural habitat greatly increases risk of damage.

In summary of this section, we find that there is growing concern in LDCs about basic environmental problems and some response to the call for eco-development. Although I personally find the extreme doomsday prophesies over-dramatic in relation to the situation in much of Africa, there is a need for widespread and urgent attention to maintaining the natural resource productivity base.

Implications of These Changes in Technology, Society, and Environment for Natural Resource Development

The interests of LDCs and the rest of the world are in maintaining and improving the natural resource productivity base. Minerals will be extracted and thus used up. Most other natural resources should be dealt with as being renewable--agriculture, forestry, water use. There ought not to be a conflict between development goals and environmental concerns, but often there is. Because this conflict exists it is important to define the most vital issues and to build them into development program perspectives.

Given the need for an income spread in rural areas, a second important question relates to the kind of natural resource development that is most appropriate. There are probably as many answers to that question as there are different countries and situations. But if local people really are to benefit from natural resource development, we need to give attention to current resource systems use by rural people. If we can involve people in improved use of their environment we tackle several fundamental problems at the same time.

Technology of natural resource development thus becomes a vital component. It should not necessarily be high or low or some other technology. It should be appropriate. To determine what is appropriate needs first a

Table 2—SOME PARAMETERS OF RESOURCES AND RELATED ENVIRONMENTAL PROBLEMS IN EAST AFRICA

Resources and Related Environmental Problems	Importance			Rate of Change	Potential to Affect or Alter the Problem	Concern		
	Severity	Frequency	Population at Risk			External	Internal	Author
Human Resources								
Population Growth:								
Urban Congestion	+	+	−		+	+++	++	++
Rural Involution	−	−	+	↑ →	++	+	+	++
Quasi-Natural Hazards:								
Drought	+++	++	++	↔	+	++	+++	++
Flood	++	+	+	↔	+	−	++	+
Endemic Disease	++	++++	+++	←	+	+++	+	+
Fire	+	−	−	↔	+	−	−	−
Technical Hazards:								
Auto and Related Transport	+++	+	−	↔	+	+	+++	+++
Industrial Accidents	+	−	−		+	−	−	−
Occupational Diseases	−	−	−		−	−	−	−
Land Resources:								
Soil Erosion From Cultivated Land	−	−	++	↔	+	++++	+	++
Rangeland Deterioration	++	++	+	→	−	+++	+	+++
Forest Destruction	−	−	−	→	+	+++	+	−
Unplanned Urban Land Use	−	+	−	↑	++	++++	+	+
Uncoordinated Rural Land Use	−	+	+	←	+	−	+	+++
Water Resources:								
Industrial	−	−	−	→	++	+	+	+
Sewage and Human Waste	+	+	+	→	−	+	+	+
Water Related Diseases	++	++	+++	↔	−	+++	+	+
Air:								
Pollution	−	−	−	↔	+	+	+	+
Other Risks:								
Conservation of Wildlife	+	−	−	↔	−	++++	+	+
Marine Pollution	−	−	−	→	+	++	+	+
Agricultural Chemicals	−	−	−	→	++	+++	+	+
Biological Crop Hazards								
Birds, Insects, Vermin	−	++	+++	↔	−	+	+++	+++
Wildlife and Livestock	+	−	−	↔	−	+	++	+
Micro-parasites	+	++	++	↔	+	++	+	+

Key Not Significant − Moderate ++ Very High ++++ Increasing → Decreasing ←
Low + High +++ Rapidly Increasing ↑ Stable ↔ Rapidly Decreasing ↓

-Leonard Berry and Robert W. Kates: Views on Environmental Problems — in East Africa. The African Review, v. 2, no. 3, 1972, p. 299-314.

careful range of goals and objectives statement. We are asking once again "What are the alternative approaches to conventional development activity?" My colleagues and I recently listed at least five different sets of alternative approaches:

1. emphasis on preventing underdevelopment--defined as the impoverishment of LDCs through world economic system operations,

2. emphasis on approaches to provide basic human needs for poorest nations and for the poor people in somewhat better off nations,

3. eco-development--assessment of development program impacts on environmental potential and ensuring that human activity is harmonious with that potential,

4. intermediate technology--fitting it with the social and economic status of the area and people, and

5. participant development--bring communities into natural resource development program decision-making at all stages.

Many are now beginning to struggle with problems of application. While I know that there are no simple solutions, I do see some of the ingredients for a workable approach:

1. emphasis on development of local resource systems--not preservation, not abolishment but development--so that future systems are a compound of the local and the introduced,

2. emphasis on regions and regional mixes of activities--not necessarily integrated development but linked development,

3. coordinate local resources use as a basis for rural development,

4. develop technology mixes including technologies of data gathering, and

5. an experimental approach.

For AID a non-defensive approach is suggested on natural resource and environmental issues--linking longer-run productivity concerns with month-to-month and year-to-year projects.

The new distribution and growth emphases and new concerns with the environment define technology and assistance scenarios. Consideration of environmental issues and uses of appropriate technology provide the only key to future use of some lands.

SYMPOSIUM PRODUCTS

OVERVIEW

[Mr. Arnold spoke briefly in his closing remarks to the effect that AID/OST appreciated the opportunity afforded by the new format for a free exchange of information, experience, and philosophy, and expressed the hope that the symposium would be as useful to the University of Arizona as he felt it had been for AID/OST. He then called upon Dr. Robert L. Seale, Chairman of the Management Committee of the University of Arizona's institutional 211(d) Natural Resources Program, to share with the participants his thoughts as to the overall impact of the symposium]:

[Seale]: The one topic that has seemed pervasive to me in all our discussions is the emphasis on the necessity to develop institutions within LDCs. Indeed if we wish we could establish institutions which would have a matrix of renewable or non-renewable resources in one direction, and technology, environment, and social conditions in the other. The necessity of dealing with any or all of these problems boils down to the fact that we need institutions--more than universities--governmental structures to respond to those needs within those countries.

... I think it important to recognize that in many cases those institutions are luxuries, generally available only in developed countries ... [because] the presence of people concerned with the problems of technology transfer is greater there. While there are classical universities of long and deep traditions in many LDCs, the kind of institutions I mean are rather schools, bureaucracies, agencies, and research institutes where we ultimately have to seek our counterparts, though they may not always be there.

... This group embraced [this] concept almost totally, being present in all summaries of all areas of discussion. In recognizing that we are constituents of that concept, each of us in one way or another is imbedded in some element of that matrix. The reason it was so acceptable to us, so very comfortable is that we are part of it ... while acknowledging that we represent only a small part. Other inputs probably more important, or at least as important, should not allow us to be frustrated if we discover that our very neat and orderly approach based on these well understood relationships between institutions ... are in fact not the only input we need.

[Dr. Seale's comments were carried forward by the closing remarks of Dr. Clark Bloom, Chairman of the final Plenary Session]:

[Bloom]: An almost unanimous recommendation of each group seemed to be one that called for an overall statement of goals or policies or strategies or plans in both the countries involved and in AID. This seems to me to be a point worth noting.

Second, such goals between LDCs and AID will likely not agree in significant respects. When they do not, there will be sub-optimization in an international sense, two institutions, for example, each with its own purposes deviant in some measure from the other ...

Third, this sub-optimization will be most noticeable--in this case with respect to AID--if planning is done by special interest or professional groups. As technologists value technology, each professional values his profession and hopes to maximize its use in ways that seem appropriate to the particular profession.

The fundamental goal of AID's work in LDCs is, as the social issues group noted so well, to develop socioeconomic systems through resource development or professional development. If this is important, then it and not technological or professional work per se is obviously the goal. If what Dr. Seale was saying was that all of us have high professional standards, I agree with him that we carry them with us but that they must be questioned continuously.

With these general comments and admonitions in mind, let us now turn to the "laundry lists," specific realms within AID, within LDCs and within the existing and proposed relationships between AID and LDC which have been identified as those in need of strengthening. These lists are reproduced as selected and edited by the publication contractor. Complete, produced-in-the-brainwriting-sessions working lists are appended.

I. Guidelines for AID in Assisting LDCs with Natural Resources Development

A. Technology.

- All technology should be appropriate technology which includes management techniques as well as production or mechanization techniques.

- Appropriate technology must emphasize local social, political and economic goals as expressed in local priorities, policies and enthusiasms. And it must meet local needs using local human and natural resources to avoid developing LDC dependency relationships with Donor Countries.

- Several factors should be weighed in selecting appropriate technologies including labor, economics, productivity and quality of output, indigenous technology, natural resources, safety and health and overall development plans.

  - Labor--is it available long-term and/or seasonally? Labor intensivity appropriateness must be weighed.

.. Economic--factors to be considered include capital requirements and availability, local and foreign markets conditions and the economic efficiency of production.

.. Productivity--labor productivity and product quality must be increased.

.. Indigenous Technology--impacts of new technology must be considered.

.. Natural Resources--the emphasis must be on energy. Fossil fuels must be used wisely while increasing use of new and unutilized or under-utilized energy sources such as wind and solar. Short-lived energy sources should be avoided for developmental technology unless they are only a means to an end and their limitations are well understood.

- There need to be available methods to measure and assess technology levels for existing or proposed projects to determine effectiveness of technology transfer. The availability spectrum needs then to be reduced to a few alternatives to make the decision process easier. It should be remembered that what is considered appropriate technology may vary in from country to country, within a given country and even from activity to activity within a given project.

- There is a need to establish a cadre of trained appropriate technology specialists to translate technology and to serve as liaison between those who develop technology and those who will use it.

- Information dissemination systems must be developed using already existing and usually adequate data to help prevent "inventing the wheel" again in many locales within a region or country. To accomplish this goal state-of-the-art publications must be published where none exist.

- AID must become committed to dispelling the notion that appropriate technology is second-rate technology.

B. Environment. According to the rapporteur the group considering the environment was given the following question by its facilitator: "What environmental considerations should concern AID in attempting to assist LDCs develop natural resources?" The rapporteur further

noted that the group did not really answer the question but did develop a general outline about how AID could meet its environmental obligations. Five broad areas are discussed in the outline which follows:

- AID must increase its awareness of the importance of environmental considerations in choice, design and implementation of LDC projects to be assisted.

  - AID needs very clear policy and procedures to implement that policy.

  - AID needs an in-house education and information training program although it is not now fully equipped for such an undertaking.

- AID must improve its environmental assessment capabilities.

  - A limited number of environmental specialists should be added to AID's staff to guide environmental assessment activities and to generate various program guidelines in areas of development such as water, renewable, and nonrenewable resources.

  - These efforts should be expanded later into many other AID and LDC activities including incorporating environmental considerations in AID project design and evaluation processes and in monitoring post-project environmental consequences, if any.

- AID must increase the interaction between itself and LDCs to enhance LDCs' understanding of AID's environmental concerns and obligations throughout all phases of each development project formulation and implementation.

  - Interaction between AID and LDCs in necessary to reach common understandings with respect to AID's environmental policy constraints and LDC environmental concerns.

  - Close AID-LDC collaboration is called for in project choice, design and development.

  - Perhaps five-year development assistance program systems utilizing locally developed data to make environmental assessments could be jointly created by AID and LDCs.

- AID assistance to LDCs must improve LDC capabilities to participate in and eventually conduct environmental assessments.

  - AID should help develop LDC institutional capabilities and provide technical assistance as needed.

- AID should work with other donor agencies to develop uniform environmental procedures, harmonize approaches and exchange information to make the process easier for recipient LDCs.

Until environmental assessment becomes an accepted, integral part of the program design within AID and recipient LDCs, the question is: "Who bears the cost of assessment?" the group finally queried.

"The results of these discussions were very heartening because they track very well with an AID policy determination adopted in August 1975," said rapporteur Molly Kux. "It has two basic formats," she continued. "One dictates that AID takes environmental consequences into account in making decisions about which LDC projects to assist (*), the second provides for AID assistance to LDCs in developing their own assessment capabilities (**).

C. Social Issues.

- AID's social sciences emphases should focus on improving socioeconomic systems through resource development and not on measuring adverse impacts of development of those resources. Perhaps as add-on projects, AID could review means to reduce adverse impacts as defined by the LDC host.

- AID should attempt to understand population dynamics with respect to proposed development projects, i. e. migration.

- AID should attempt to assay the stability of development policies in host LDCs and to define AID interests vis-a-vis marginal or unofficial groups, i. e. environmental interest groups, as an example.

(*) Policy Determination, PD-63, August 1, 1975: Environmental Aspects of Development Assistance. USAID, 8 p. Apply.

(**) Environmental Procedures [22 CFR Part 216] [Regulation No. 16]. USAID, 33 p. Apply.

- AID should undertake data base acquisition because U. N. data generally are too broad, covering entire countries and regions. AID should have data bases at province levels, for instance. Data categories should include per capita income, life expectancy, educational levels, health indicators, access to information, stress indicators, unemployment and migration patterns.

- AID should reevaluate social science tools and methods to determine what western or industrial biases are extant.

- AID should seek to define what motivates cultural groups to innovate, i. e. the specific innovative methodology employed by specific groups.

- AID should help establish in LDCs an indigenous capability to determine socioeconomic wants, needs, and desires which later can be incorporated in project design.

- AID should recognize that nomadic societies may be essential in certain geographic regions.

- AID should develop education systems with the capability to train indigenous social scientists through LDC-AID cooperative ventures even if conventional cost-benefit ratios are adversely affected.

- AID should evolve social indices methodologies for varied socioeconomic environs.

- AID should acquire experts from LDCs to assist in problem solving evaluations.

- AID should seek beneficiary group input in project design, perhaps making use of third-country nationals also.

- AID should insure that perceived risks, especially economic risks, to beneficiary groups are minimized.

- AID should increase its sensitivity to host country governments' goals to reduce possibility of conflict.

- AID should design projects which will require minimal change in existing social patterns so that the rate of change will be slow and within the framework of existing ideologies.

II. Organizational and institutional constraints deemed in need of amelioration according to consensus perceptions of the varied groups involved in the conference interactive processes.

A. The groups perceived AID/Donor Country institutional and organizational activities requiring enhancement as being:

- Funding--inability, unwillingness or lack of funds to engage in long-term programs. Concomitantly, there is an inability to telescope long-term programs with long-term benefits into short-term projects acceptable to local LDC governments under pressure to produce. This combination generally leads donor agencies to engage in subterfuge: a series of short-term projects are designed to replace the previously unacceptable long-term program.

- Technical biases in AID are a problem. Technical data often are not made meaningful to LDC decision makers.

- AID needs to devise methodology to fit local LDC circumstances, especially with respect to technical assessments involving economic, social and environmental factors.

- AID does not always recognize overriding political factors in LDCs.

- AID does not systematically examine past program case histories to determine what does and does not work in given LDCs and within given programs so that previous mistakes can be avoided.

- AID does not build into programs the mechanisms necessary to adjudicate disputes that may arise during the course of a development project.

B. Conferees saw LDC areas in need of strengthening as being:

- LDC decision making is weak because of the lack of expertise and because of inertia.

- LDC programs suffer from political and technical distractions as well as diversion of funds.

- Instability in LDCs creates program discontinuity and changes in priorities, plans and goals. Even where

there is stability in government, high personnel turnover rates in planning and management agencies produces similar disruptions.

- LDCs sometimes lack flexibility necessary to adjust to unforeseen situations which arise during project planning and implementation.

- There is a general lack of qualitative and quantitative data bases and knowledge in LDC institutions which makes technology transfer and problem identification difficult.

- LDCs usually manifest a lack of infrastructure, communications, markets, transportation and ability to implement and maintain programs.

- LDC human resources development is scanty which results in a lack of technical and administrative expertise at high and middle levels. This problem is particularly evident when multidisciplinary programs are undertaken.

- The lack of capital in LDCs is common.

- LDCs generally do not have methodologies for implementing national development planning.

- LDCs are weak in considering tradeoffs between development schemes and environmental protection.

C. <u>Constraints shared by AID and LDCs included the following:</u>

- AID personnel tend to slip into teacher-student roles with LDC counterparts.

- Internal and external communication is sometimes lacking within AID and LDCs as well as between each.

- AID and LDCs occasionally plunge into projects without careful prior planning.

- AID and LDCs do not always recognize common needs, issues and opportunities within regions based on cultural, economic and/or geographic factors.

- AID and LDCs have experienced exploitation by one another.

III. Water Resources Development Constraints and Alternative Appendices

A. Specific constraints to developing water resources in LDCs were viewed as being:

- LDCs individually and together have failed to develop water laws with respect to boundary waters, international river basins, transboundary aquifers, weather modification, and the seas.

- There are difficulties in matching appropriate technologies to local capacities in the area of urban and rural water supplies, waste water management and reuse.

- In humid tropic regions, relationships between water and other resources are largely under-utilized.

- The economics of developing saline water-tolerant crops has been neglected.

- Techniques for assessing and developing groundwater and other water resources efficiently are lacking.

- That implementing and maintaining water-related projects depends upon supporting industries and the relationship of energy to those projects, especially in irrigation, has been overlooked for the most part.

- Failure to develop water-costing, water-pricing and alternative-use value systems has left many LDCs without adequate capital and financial support to fully develop water resources.

- Engaging the interest of the general population in the decision making processes and assessing the requirements of various special interest groups concerning water development programs have not usually occurred.

- Water utilization needs have not been related to the needs of special social and/or cultural factions.

- LDCs generally fail to project the effects of proposed water developments with respect to health, cultural, social and other factors.

B. Alternative Approaches to Water Resource Development Problems

- AID should develop programs and projects to assist LDCs establish high level organizations for water resource planning--local, provincial, national, regional, interbasin and including boundary waters.

- There should be emphases on conservation and effective farm-level management of water resources which would include a training component extended to technician and farmer levels.

- There is need to establish regional planning, research and training institutes separate from national water resource institutes which are involved in planning only. The regional institutes also would encourage sustained LDC-U. S. universities linkages for planning integrated river basin developments.

- Projects should begin by encouraging improved use of surface water and be addressed to local areas to take care of poorer populations' immediate needs.

- Institutes would develop new water resources through creation of infrastructure technology; conducting social studies; and generating new technologies for groundwater resource evaluation and recharge estimation to assist local governments analyze legal and cultural constraints while moving towards more effective use of water resource systems.

- Institutes will have to develop less expensive and more effective urban and rural water supplies and urban sewerage systems, integrate water resource analysis by satellite imagery, and increase water assessment capabilities.

IV. Renewable Natural Resources Development Constraints and Alternative Approaches

A. The group charged with delineating areas of weakness in renewable natural resources programs tended to view the major problems as being organizational and/or institutional in nature; hence, those products have been included in Section II. A.

B. Alternative Approaches to Renewable Resources Development Problems

- The internal capacities and capabilities of LDC resource-related institutions and personnel need to be strengthened, including policy development and planning.

- Support of local governments in regional collaboration is necessary, as is recognizing the presence of political, economic, and other constraints to be overcome.

- Systems approaches should be promoted to determine extent of natural resources and optimal uses, including resources surveys and assessments.

- Exploitation of renewable resources must be integrated within national socioeconomic priorities.

- Long-term, maximum sustainable yields of renewable resources must be determined, including resource management techniques and investments requirements to insure the renewability factor.

- Data bases and information exchange systems necessary to national exploitation of resources must be developed.

- Multiple-use concepts must be encouraged. In forestry, for example, the forest should not be viewed solely as a wood products source but also as a watershed, an ecological system, a protector and enricher of soils, and as area for recreation.

- Forests must be viewed as regional resources for the regional markets.

V. Nonrenewable Natural Resources Development Constraints and Alternative Approaches

A. The group assigned to discuss the realm of nonrenewable natural resources developed a list of constraints which included the following.

- Many universities in donor countries exhibit little interest in or concern about nonrenewable natural resources in LDCs. Studies are almost nonexistent.

- Advanced technology required for developing mineral resources is lacking.

- It is not yet known whether or not intermediate technology can be employed in mineral resources processing.

- Little is known about maximizing nonrenewable resources development while minimizing dependence on those resources.

B. Alternative Approaches to Nonrenewable Resource Development Problems

- Assessing and cataloging basic nonrenewable resources needs to be undertaken.

- AID should support regional development organizations dealing with nonrenewable resources and identify alternative techniques to stimulate use of indigenous and raw materials and including recycling programs.

- AID should try to better understand the host country's policies and programs related to nonrenewable resources.

APPENDIX I:

Plenary Session:

Reports from Working Groups to Articulate Gaps, Issues and Barriers in Natural Resources Development, and to Identify Alternative Approaches

WORKING GROUP REPORTS AND DISCUSSIONS ON BACKGROUND SCOPING PAPER I

WATER RESOURCES:

I. What are the gaps, issues, and barriers to effective development of water resources?

A. Institutional/Government

1. LDC

a. Decision making: inertia, diversion of funds to social sector, multidisciplinary planning, not enough local expertise for basin-wide planning

b. Continuity: change in government priorities with each successive government, high turnover of management personnel

c. International agreements about boundary waters

d. Flexibility: response to unforeseen problems

2. DONOR

a. Inability for long-term commitment to see that initiated activities are supported and maintained

b. Inability to telescope long-term projects (with long-term benefits) into short-term projects acceptable to local governments under pressure for results

B. Lack of knowledge and Information

1. Data base

2. Information and technology transfer

3. Identification of problem areas and seeking solutions

4. Technical bias of foreign experts

5. Means to translate technical information into meaningful information for decision makers

6. Failure to learn from past experiences

C. Technical problems

1. Matching appropriate technology to local capability

2. Urban and rural water supplies

3. Urban waste water management
4. Farm level water management
5. Relationship of water to other resources in the humid tropics: large underutilized areas (sunshine, land)
6. Development of crops using saline irrigation water
7. Better techniques for assessing available groundwater resources
8. Remote sensing
9. Improvement of productivity and efficiency of existing water resource systems

D. Organizational Problems

1. Lack of infrastructure (communications, markets, etc.)
2. Implementation and maintenance
3. Supporting industries
4. Relationship of energy and irrigation projects

E. Development of Human Resources: Lack of technical and administrative expertise of high-middle level for multidisciplinary approach

F. Financial and Economic Problems

1. Water resource economics: cost of water, water pricing, and value of water in alternative uses
2. View of water as an unlimited resource
3. Lack of financial resources for planning and management of water resources: many reports and no projects
4. Lack of capital and financial support by local governments

G. Legal

1. Development of guidelines and legal framework for boundary waters, international river basins, transboundary aquifers, atmospheric water
2. Local water law for the orderly development of water resources

H. Social and Cultural

1. Failure to assess the requirements of different interest groups in water development and engage the interest of population in the decision-making process

2. Difficulty in relating water utilization needs to special social or political problems

3. Failure to weigh non-economic factors

I. Environmental Impact

1. Multidisciplinary approach including hard and soft sciences

2. Systems approach

II. What are alternative approaches that AID could take to water resources development?

A. AID Program and Projects List

		No. of Votes
1.	to assist countries to establish high-level organizations concerned with national water resource planning	6
2.	to emphasize conservation and effective farm-level management of water resources (this program would include a training component)	6
3.	to establish regional institutes of planning, research and training	5
4.	to encourage sustained linkages between U. S. and developing country universities for planning integrated river basin development	4
5.	develop or improve use of surface water at a small scale to involve more places initially so as to help develop poorest social groups	3
6.	development of new water resources through creation of infrastructure technology and social studies	2
7.	development of new technologies of groundwater (including fossil water) resource evaluation and recharge estimation	2
8.	to assist local governments analyze legal and cultural constraints toward more effective use of water resource system	2
9.	to develop less expensive and more effective ways of urban and rural water supplies and urban sewage systems	2

10. integrate water resource analysis: 2
    a. satellite imagery
    b. water assessment capability
    c. water usage priority assessment
    d. data/problem analysis impact analysis

11. small specific project: water reuse (sanitation/irrigation) 2

12. clearinghouse on water resources technology transfer: 2
    a. information base on successful projects
    b. transfer of "results and methodologies for all parts of the world to user groups"
    c. site visitation of demonstration projects for "user" officials

13. better AID public relations with U. S.-based groups 1

14. support of the World Water Conference in Argentina in 1977 0

15. evaluation of local patterns of land and water usage and assess most beneficial usage

B. Characteristics of AID Strategy

1. conditions of AID grants/loans should not include political bargaining
2. maximum emphasis on local participation during planning and implementation and maintenance
3. introduction of new water resources technologies should be done gradually in phases
4. finance "any" LDC project
5. train LDC personnel for all aspects of a project, conception to implementation
6. stress on multidisciplinary projects
7. stress country projects in which U. S. has capability
8. use institution impact statements
9. AID should get agreements with countries on five items:
    a. project plan and design
    b. implementation
    c. financing
    d. operating and maintaining
    e. evaluation

10. AID should use the following planning strategy:

    a. assess water resource needs, locally and regionally
    b. assess present water management strategies
    c. inventory past/present/proposed water resource programs carried out by other agencies
    d. identify the gaps in c., to meet the needs in a.
    e. determine if complementary programs to those in c. would be more efficient to the separate AID programs
    f. determine needs other than water resource needs
    g. determine compatibility of f. and a.

11. implement low-cost high-payoff and short-run implementation programs

12. AID should make maximum use of multilateral alliances. AID funds should be used for filing gaps

13. AID should provide better information on projects available to LDCs

14. greater attention should be given local customs and values

15. pick simple projects dealing with only one agency

16. AID personnel management system: rotation of personnel between Washington and field sites, and between regional field sites

17. strive to insure maximum equity of distribution of benefits from water resources projects

Water Resources (continued): Discussion

Ince: In terms of natural resources, what is the appropriate definition of the rapporteur: I think we can justly define it as the hewer of wood and the drawer of water. The opinions expressed in the following discussion are those of the participants and do not necessarily reflect my own.

We addressed ourselves to two questions:

1. What are the gaps, issues or barriers to effective development of water resources? The problem areas, or the gaps, issues and barriers were listed under, first, institutional problems, usually governmental problems, both in LDCs and in donor countries or agencies. In LDCs, decision making was deemed a problem area, for example not enough local expertise for interdisciplinary, multidisciplinary, basin-wide planning. There are problems of inertia in the political and technical fields, as well as the diversion of funds to useful but perhaps less important sectors of the society.

The next institutional problem in LDCs is that of changes in government bringing changes in priorities, plans, and objectives. High personnel turnover

during planning, implementation and management phases creates discontinuity. For effective management, continuity is essential. Another area concerns legal considerations involved in international agreements regarding boundary waters, and the fourth area deals with flexibility in LDC institutions: Is there enough resilience in the institution to tackle unforeseen situations as they arise during the planning and implementation periods?

As far as donor countries are concerned, problems are usually inability, unwillingness or lack of funds to become involved in long-term commitments, to see that the initial activities are supported and later maintained. This is a problem of the donor countries' inability to telescope long-term projects with long-term benefits, into short-term projects acceptable to local governments under pressure for results. These demands by LDCs on donor countries foster subterfuge, subterfuge where long-term projects are couched in a series of short-term and acceptable projects.

Another problem is general lack of information and knowledge. The overall lack of data and insufficient information and technology transfer at various levels is evident. There is difficulty identifying problem areas, particularly in connection with LDC institutions. The technical bias of foreign experts who simply transplant their expertise into a foreign setting is yet another concern. Translating technical data into meaningful information for decision-makers to use in investigations or in approaching problem areas is essential. Other technical problems involve matching appropriate technologies to local capabilities in the areas of urban and rural water supply; developing effective, low-cost urban waste water management; farm water reuse management; relationships of water to other resources in the humid tropics--which are considered to be largely underutilized areas--developing crops with tolerance to saline irrigation water and the economics of it; and developing better techniques for assessing available groundwater resources and improving productivity and efficiency of existing water resource systems. These are considered to be low-cost but high-yield projects.

Organizational problems are considered to be lack of infrastructure, communications, markets, transportation and project implementation and maintenance. Implementing projects as well as continuity maintenance depends on the supporting industries and relationship of energy to various water resources projects, particularly irrigation projects. Developing human resources and lack of technical and administrative expertise at high and middle technical levels in many LDCs, particularly the lack of expertise in multi-disciplinary approaches, are other problems. Financial and economic aspects related to water resource economics involve cost of water, water pricing, value of water in alternative uses, etc., and are problem areas not only in LDCs but, of course, here as well. The philosophical view of water as an unlimited resource is responsible for the lack of financial resources for water resources planning and management. Finally the lack of capital and financial support for local governments are two problems of water resource development.

Development of legal guidelines and frameworks for boundary waters, international river basins, transboundary aquifers, etc., are necessities. Weather modification aspects of water law, law of the sea, these are problems evident everywhere. Particular emphasis is placed on the necessity for local water law studies to promote orderly development of water resources.

Finally, we turn to the social and cultural aspects. There have been failures to assess the requirements of various interest groups in water development, to engage the interest of the general population in decision-making processes, to relate water utilization needs to special social or political problems and, finally, to weigh non-economic factors. These are essentially health, social, or other factors which cannot be quantified in terms of monetary values. The emphasis is to project beforehand the effects of various water resource developments on health, cultural, social and various other aspects before projects are undertaken.

2. On our second question, what are alternative approaches to water resources development, I should like to enumerate the project and programs lists because they relate immediately to problems posed in the first part of our report. First are a program to assist countries establish high-level organizations concerned with national water resources planning. Next, there is a need to emphasize conservation and effective farm-level management of water resources. This would include a training component at both technician and farmer levels. Finally, there is a need to establish regional institutes of planning, research and training. These are different from national water resources planning institutes which are government agencies looking only after planning. These are regional institutes for research, training and planning to encourage sustained linkages between U. S. and LDC universities for planning integrated river basin development. Such projects should begin by encouraging development or improved use of surface water on a small scale and should be addressed to local areas to take care of the immediate needs of the poorer portion of the population. These institutes would develop new water resources through creation of infrastructure technology; conducting social studies; and generating new technologies for groundwater including fossil water, resource evaluation and recharge estimation to assist local governments analyze legal and cultural constraints while moving towards more effective use of water resource systems. To do so the institutes would have to develop less expensive and more effective urban and rural water supplies and urban sewerage systems, integrate water resource analysis by satellite imagery and increase water assessment capabilities.

Comment: I will make one observation. It isn't a criticism of your presentation. I would say we never talked about what strategy AID should employ.

Ince: There is a list here on the strategies.

Comment: Reiterating the point, I don't think we should continue until you decide whether this is the best overall approach.

Ince: Yes, we never had time although there is a list of AID strategies.

Comment: What they should be or what they are?

Ince: No, what they should be--what is desirable actually. For example I read listed items which say "conditions of AID grants for loans should not include political bargaining," or "maximum emphasis on local participation during planning and implementation." No, I really do not know to what extent this is existing policy and to what extent it is a new direction. We have discussed these items. They were listed but we never had time for discussion or to set priorities.

Comment: It is also worth noting that that's not necessarily a consensus. That's a laundry list.

Ince: That is a laundry list. In a sense there was some degree of ranking because items were voted on. I see here, for example, "Number 1 is to assist countries establish high-level organizations concerned with water resource planning systems." Six out of 11 voted for it, as I remember. That was one of the higher ranked items.

Comment: I don't think that distinguishes between what AID/Washington is really focussing on and what the people in the field are focussing on. I think they are very different views of the world.

Ince: Well, Dave Malone, you might have a comment at this stage of the game. This is a fairly preliminary task, identifying strategies or approaches. Is the rest of the operation going to refine this somewhat?

Malone: I wish you hadn't asked that question. I don't know if this is an appropriate time to give an adequate response to that question because there are many subtle implications in the response.

Arnold: However, in keeping with the tone of some of the comments that have been made so far, my perception is that there was enough interest in strategy, but that there wasn't enough emphasis on tactics. It wasn't clear what this group was supposed to be focussing on--on the high or on the low level. The initial idea in putting this meeting together specifically was to avoid directing the group, letting the group feel its way into the fog. The question is, "What's lurking in the fog?" I think from the presentations this morning you begin to see that. Presentations and comments will be more specific because of the topics which we will discuss today.

Johnson: What we do today is break up in different groups, talking about different topics from yesterday's. The charge you gave me was to come up with strategy for environment and natural resources. I question seriously that what Simon Ince presented was strategy for development of water resources. You questioned why we couldn't find any strategy. We didn't get to strategy.

Ince: No. We didn't get to the strategies.

Comment: If I could post a rhetorical question here. Is the objective of the meeting to develop strategy or is the objective of this meeting to provide information for the AID people to develop strategy?

Malone: My feeling was that although we would not be able to develop a refined strategy in three days, nevertheless by discussing these problems in the various ways possible through group interaction and by examining the three kinds of resources from the standpoint of three major elements we might be able to provide not the strategy, not the solution, but the kinds of guidelines that would be important in laying out and selecting priorities in the future. We also hoped to identify gaps in knowledge to become topics for research programs in the future. Now, if we could get further than that it would be fine, but I thought we'd be doing well if we could identify issues, problem areas, gaps, and produce some guidelines--guidelines being less refined than strategies. The meeting is very flexible. I'm just giving you my ideas. I think the others have different views.

Bloom: The shopping list that you gave us reflects a rough set of priorities. It seems to me that just by implication both strategy and practice are in it. Now, the strategy is that there ought to be country agencies planning for water resource development. The tactics are suggested in terms of the need for better data. We need universities to be tied in with planning strategy. We need it to be supported by regional training programs. There is by implication a strategy here, although it may not be a strategy that we wish to accept.

Johnson: No. My only concern is that I have contract requirements to publish a proceedings. Do I come out with a shopping list that would imply strategies and tactics without specifying them or do we have the responsibility to interpret all this and print our interpretations as strategies and tactics developed at this conference?

Ince: If we had more time to go over some of these ideas I think we can come up with a degree of strategy and practical action. If more time was spent in discussion and reorientation, matching the problem areas with solutions and strategies it is possible to come up with specifics. To what degree I don't know, but it is possible, I feel.

Malone: We are one-third of the way into our operation. We have raised important questions. I don't think we need to try to answer you completely right now. I propose that we go a little farther into the fog.

RENEWABLE RESOURCES:

The Renewable Resources group numbered 15 persons who identified nine factors of prime importance to renewable resource development and utilization. The group then identified 31 alternative approaches to effect the rational utilization of natural resources. Five of these were selected as being most important, as perceived by the group.

I. Prime factors:

1. The dilemma of long-range goals versus short-range needs
2. The need for training and education, at all levels, i. e. "manpower development," so that the developing countries can make their own assessments and technological choices
3. The need to establish a data base, suitable in quality and quantity
4. The need for devising methodologies to fit the local circumstances, especially technical assessments, including economic, social, and environmental factors
5. Recognition of overriding political factors
6. Equality, i. e. recognition of technology transfer through colleagues working together, rather than a teacher-student or parent-child relationship
7. Communication, both internal and external
8. Cautious experimentation, e. g. on-site testing, scaling up through pilot plants, and periodic evaluations
9. Recognition of common needs, issues, and opportunities within a cultural economic or geographic region

II. Alternative approaches:

1. Strengthen the internal capacity and capability of resource-related LDC institutions and personnel, including policy development, planning, national support, and regional collaboration. The presence of political, economic, or other constraints should be recognized and overcome to the extent feasible

2. Promote a systems approach to determine the extent of a natural resource and its optimal use. "What do you have and what do you want to get from it?" This includes national resource surveys and assessments, technological choices, and exploitation integrated within national priorities and socio-economic conditions

3. Determine the long-term "maximum sustainable yield" for the renewable resource, including the resource management and investment requirements to insure the renewability factor of the resource

4. Develop the data base and information exchange system necessary to the rational exploitation of the resource

5. Encourage the "multiple use" concept, e. g. approaching the forest resource as a watershed, an ecological system, a wood products source, a soil protector, and for recreational use. It should also be a regional resource for the regional market.

Renewable Resource (continued): Discussion

Arnold: The rapporteur for the group is William H. Littlewood, Office of Science and Technology.

Littlewood: The renewable resources group worked hard, but we also felt the time constraint. The renewable resources we perceived as being wood. The fisheries resource and the biomass resource were perceived as solar energy converters and were considered also. However, I think the forest resource was probably dominant in our minds.

For our first task we identified nine factors of prime importance to renewable resource development and utilization. We then identified 43 alternative approaches to effect the rational utilization of natural resources. We trimmed that down to 31 because there was redundancy. We crossed out certain ones and incorporated them into other categories. Then as the last exercise, through a voting procedure that you are familiar with, we selected five categories as being most important. Although it was a group selection, I did have some personal input in elaborating some of the rather cryptic, one- or two-word alternative approaches in this list of 31. I invite the group to correct me if I have misinterpreted them in some way.

1. The first item is the dilemma of long-range goals versus short-range needs. What we're talking about is the case where somebody is hungry. No matter what you tell him about the renewable resource such as his next annual seed crop, he may eat the seeds if he is starving. Or, the case of Nepal mentioned earlier where the mountainside forests have been cut for firewood.

The long-range impacts in Nepal and India are horrendous. But it is very difficult to make people realize that when they need the firewood immediately. We don't have any solution to that dilemma. I just wanted to point it out as a very important one.

2. The second category is, I think, an obvious one--need for training and education at all levels. Manpower development is necessary so that the developing countries are able to make their own assessments and technological choices.

3. The third item is the need to establish data bases both from qualitative and quantitative viewpoints.

4. The fourth category is the need for devising methodology to fit local circumstances, especially technical assessments including economic, social and environmental factors.

5. The fifth item is recognition of overriding political factors. It often happens in forestry that for political reasons, for example, a provincial governor will have control over the forests. He is more interested in immediate remuneration rather than the long-term renewability aspects of the resource.

6. The sixth point is simply equality. My interpretation of that is that it's a recognition that technology transfer has to be accomplished through mutual equality. A developed country and the developing country work together as colleagues rather than as teacher-student.

7. The seventh point is communication, both internal and external.

8. The eighth item is cautious experimentation. The way I interpret that is, for example, on-site testing, scaling up from pilot plans, periodic evaluation, reevaluations. Enter into resource exploitation in gradual stages.

9. The ninth point is recognition of common needs, issues and opportunities within regions based on cultural, economic, or geographic factors. Latin American or Central American groups are good examples.

We will next go to the approaches to renewable resource development and rational exploitation. These were selected through voting procedures from the 31 listings that we developed.

1. The first one is strengthening the internal capacity and capability of resource-related LDC institutions and personnel. This includes policy development and planning. The support of the local governments in regional collaboration is necessary as is recognizing the presence of political, economic and other constraints which should be overcome to the extent feasible.

2. The second point is promoting a systems approach, systems input/output to determine the extent of the natural resource and its optimal use. This includes

natural resource surveys and assessments to determine resource identity, the technological choices and how it is going to be exploited. Then exploitation is integrated within national socioeconomic priorities. Pay attention to national priorities and to the constraints of culture and social conditions. There may be choices of labor intensivity versus capital-intensive technology.

3. The third point is determining the long-term maximum sustainable yield. This would include resource management and investment requirements to insure the renewability factor of the resource. In the case of forestry, it would incorporate management of cutting procedures, harvesting procedures and include reforestation where timber has already been cut. Reforestation is important to the long-term goal of resource renewal.

4. The fourth point is developing the data base and information exchange system necessary to national exploitation of the resource.

5. The fifth approach is to encourage the multiple-use concept. For example, a forest shouldn't be looked upon as only a wood products source but also as a watershed, an ecological system, soil protection, in some cases as soil enrichment and for recreational use. It may be advantageous, for example, to the tourist industry. A forest should also be a regional resource for the regional market.

Comment: These points look like strategies.

Littlewood: Well, these were intended to be strategies.

Comment: What I'm saying is that they come out in the order of importance and almost complete in the methodology.

Littlewood: The ordering here is according to vote and the selection from the 31 points. This should not be looked upon, I think, as a complete exercise. I suspect that given the time pressures the group did overlook some points that might be included in developing an appropriate approach or project. However, these were not intended to be projects. The principles outlined would probably apply to all projects whether fisheries or forest resource.

Comment: There is a difference between strategy and what might be called a logical sequence of steps to approach a problem. I think part of our discussion revolves around the fact we are not using the word exactly the same way.

Long: We have a dilemma perhaps in focussing on whether the exercise is entirely for our office or for AID or for even a broader audience. I don't know if Henry Arnold has any comment on that. How specific do you want to be?

Arnold: It would be useful if we could establish the boundaries and constraints which would make it possible to come out with a feasible AID program or a feasible set of AID projects.

If we were to take the congressional mandate literally we'd have little room for maneuvering at this conference because it doesn't include much about renewable or nonrenewable resources outside of agriculture. It doesn't even specifically discuss water except as it relates to growing food. So, I'm reluctant to try to tie it down too tightly because I think we will be engaged in an exercise not of futility but of frustration if we plan too tightly. I would suggest that we bear in mind that there are some limits but as Bill Littlewood says maybe we're talking about programs in which other agencies, other donors, might take part. And maybe we're talking about ways in which we should urge AID to change its policies in the future. I'd like not to rule out these possibilities.

Comment: Certainly, the report of this meeting is intended for a wider audience than our office.

Comment: Bill Littlewood's remarks finally identified what it is that worried me about both of the background scoping papers. They suggest means of doing things that we have not accomplished even in this country. We have never had a systems approach to water resources development for example. We have never looked at alternative uses and we are recommending for a lesser developed country that which we have never achieved here.

NON-RENEWABLE RESOURCES:

The Non-Renewable Resources group divided into two sub-groups, and the following reports of their brainwriting sessions to articulate gaps, issues and barriers in natural resources development are likewise presented separately:

Sub-Group A

Definitions:

GAPS are information on nature and extent

BARRIERS are social customs, lack of infrastructures, established markets, capital for investment, technological demands and skills

Gap: Well organized collection of case histories showing why certain natural resource development projects succeeded or failed

Barrier: Barriers include distrust and suspicion as to the intent of the developer

Barrier: An equal barrier is lack of confidence on part of developer for a reasonable security of his investment

Issue: The problem of economic relationship between those who supply and those who use--ownership, price, timing, size of investment, possibility of exhausting the resource

Barrier: Rate of resource consumption exceeding rates of discovery or development

Issue: Is it an acceptable thing to trade renewable resources necessary to sustain life (food) for nonrenewable resources (minerals)?

Gap: That's what trade is all about, but mechanisms have to be devised so that the price relationship is fair and adequate, and that it works to the mutual advantage of the parties involved

Issue: Threat of nationalization and loss of investment by private companies

Gap: Lack of strong geological surveys needed for broad-based mineral resource evaluation

Barrier: Should investment be made in exploration if the world price structure is weak? Could international organizations (banks and science/technology) fund the needed exploration?

Barrier: It may be possible to show that investment in exploration should be made at times of weak price structures because at these times costs would be least

Barrier: Nationalization is inevitable. The means for cooperative effort to best possible mutual advantages must be developed-can be developed

Barrier: Recognition that leaner and leaner ores require greater input of energy which itself has limitation problems

Issue: Relating utilization/exploitation of natural resources to basic country development programs

Issue: Nonrenewable resources only indirectly related to problems of urban and rural poor

Issue: If nonrenewable resources are developed and exchanged for industrial goods and services at an adequate and fair price to LDCs (terms of exchange), they could help to improve the well being and standard of living of the urban and rural poor

Issue: Assuming external financial and technical resources to be needed, what is the proper share of equity and earnings for the participants?

Barrier: That share that supports continued growth and at the same time improves the well-being of workers and owners of lands and contained resources on which success of the enterprise also depends

Issue: How is that share determined?

Barrier: Lack of interest on part of many universities in developed countries on natural resource problems of LDCs

Barrier: That share which enables the resource country to expand and develop its developmental base

Issue: Examination of conceivable rate of utilization/exploitation as applied to country development indication of alternative rates

Issue: Who owns ocean-bottom resources and who should develop them?

Issue: Those with the technology will certainly develop them

Issue: Establishment of priority for nonrenewable natural resource development with <u>appropriate</u> conservation and protection measures outlined

Barrier: Difficulty in natural resource exploration in hot, humid tropics having thick, weathered soil cover and dense rain forest cover

Issue: Strategy involved in creating indigenous manpower capability versus using external educational resources, i. e. geologists, geoengineers, economic geologists, etc.

Issue: Overall assessment of nonrenewable natural resources to the extent that a relation to country development programs can be established

Gap: If only related to country development programs, it would fail to take account of the global interaction of countries

Issue: LDCs have the physical resources but generally speaking not the human or economic resources for development. The reverse again generally speaking is true for the developed countries

Gap: To date, natural resources development has meant the establishment of capital-intensive, low labor industries devoted to the exportation of the resource in its least processed form thus generating the labor-intensive industries in the importing countries. As a result the exporting country is exporting much needed jobs as well as nonrenewable resources.

Gap: Both issue and gap can be more clearly addressed if basic information about extent of resource and application to country development program is first determined

Issue: The development of industries for processing of nonrenewable resource materials will aid in the solution of problems of poverty but will contribute to problems of energy supplies

Gap: Adequate geological map coverage at an appropriate scale necessary for resource evaluation

Gap: Use and training of indigenous human resource evaluation versus using external expertise

Barriers: Social systems which equate a white shirt and desk with power and status and a monkey wrench with serving others

Sub-Group B

Lack of knowledge of the actual resource base in LDCs

Many times the knowledge is obtained by outside experts on loan to the LDC who take the most important data away on departure

When the donors withdraw their support the LDC often loses the capability to operate the system

What would be the universal requirements to achieve LDC capability to acquire and use data and operate systems? Then what mechanisms would do the jobs? Do LDC governments perceive this as an important need as far as national policy is concerned?

Lack of data collection systems and the ability to interpret that data, except in rare LDC cases but even then depth of capability is often too thin to permit country-wide assessment

Many resources which are classified as renewable are operationally nonrenewable--for example forests in Nepal, water quality of rivers in popular countries, etc.

Unreasonable exploitation of resources, i. e. metallic minerals exported as concentrates, not as a final or semi-processed material

What are the LDC government policies regarding nonrenewable resources, or is this an area where knowledge of the problem and its consequences is not fully understood at the highest policy levels?

Trade-offs between environmental concerns, economic and employment benefits, social and cultural patterns, institutions, etc.

Gaps: How best to maximize nonrenewable resource development?

How to train a basic cadre which can learn to maintain and operate the hardware involved in nonrenewable resource development?

Lack of local know-how in exploitation but mainly in processing

Gap: How to minimize dependence on nonrenewable resources

Good example of current emphasis are energy alternatives to reduce balance of payment deficits and dependence on external supplies

Issue: Should a developing country husband its resources for its own internal use or exploit these resources for maximum foreign trade?

Can intermediate technology help indigenous use of resources, such as crushing rock-phosphate and applying directly on farm rather than sending raw materials abroad?

How long should nonrenewable resources be husbanded?

1. Barriers: lack of technological support (local, trained labor) funds and stable institutions to enable development of nonrenewable resources

2. Advanced technology is generally fundamental to identification of nonrenewable resources and such skill/hardware are not generally accessible to LDCs except through donor countries

3. Advanced technology skills/hardware are becoming increasing available in LDCs. Donor countries tend not to reveal their findings to LDC governments unless expressly required to do so

4. Appropriate technology for development of small mineral deposits strictly for local use

1. Gaps: incomplete knowledge of the resources (kind, quality)

2. Again relates to government development policies which do not always recognize urgency of national raw materials exploitation as substitute for imported raw materials or semi-processed materials

3. Systematic analysis of options for long-range nonrenewable resource utilization

4. Complete knowledge not needed but increasingly good approximations are absolutely vital. If Arizona fossil water will last 50-100 years, the 49th year the question of whether or not there are 1 to 51 years left should be known!

5. Institutional arrangements

Issue: Should development strategy be to operate on steady-state conditions (complete dependence on recycled materials) rather than increasing dependence on nonrenewable resources?

Is reclamation/reuse of nonrenewable resources economically competitive (or even viable) for a developing country? Presumably developing countries will not be in a position to consume most of their "mined" resource, since it will be largely exported.

Issue: Environmental pollution versus pollution control in the development of nonrenewable resources

1. Is pollution control and associated costs a crucial factor in deterring development of nonrenewable resources?

2. Lack of skills in international trade and in marketing

3. Poor institutional structure in resource development

4. The problem of usefully employing the second rate oil prospector (see comments on a mature brain surgery).

Most LDCs recognize problems of pollution and environmental control. Many governments are willing to "trade-off" future problems in favor of more immediate exploitation of resources as rapidly as possible

The major barrier to nonrenewable resource development is the lack of sophisticated technology and skills generally associated with extractive processing

The sophisticated technology and skills for extractive processing can be imported from developed countries at the price of profit to the suppliers of know-how

The implementation of sophisticated extractive technologies are energy intensive and depend on solution of this problem first

Weakness (in some countries) in development policies in mineral exploitation--poor legislation

Does the concern of foreign exploitation by LDCs inhibit the willingness to import expertise and thus raise barriers to development?

Constraints

1. Lack of inclusion in LDC five-year plans of emphasis on establishment or development of primary industries which might process raw materials

2. Financial constraints in resource development

3. Energy constraints

4. Training and education programs geared to identification, extraction, processing, marketing, and international finance

5. Cultural and environmental aversion (inertia) to fundamental change in the power, political, social, and physical climate of an LDC may be significant constraints. Why should people work and strain their personal and institutional traditions when they can subsist in a satisfactory ambience with their understanding of the world?

NON-RENEWABLE RESOURCES (continued): Alternative approaches to development

[see Parham's discussion following the list of 33, below, for explanation of selection of nine priority alternatives. Numbers in parentheses indicate number of votes assigned to each by members of the group.]

1. Assistance in assessing and cataloging basic non-renewable resources (14)
   a. develop geological data bank from in-country drilling (water, etc.)
   b. expand or derive new knowledge
2. Assistance in institutional capability for planning resource development and management (institutional development for natural resource programs) (13)
3. Support collaborative research and survey on resource development (12)
   a. pairing of LDC and state geological survey in industrial mineral and environmental geology
   b. geology and geophysics 211(d) field work in LDC
4. Long-range "systems" planning as applied to non-renewable resource development (12)
   a. assist in evaluation of rate of natural resource use
   b. less emphasis on short-term highly visible projects and more emphasis on continuity
   c. large LDC city use of own country's resources
5. Development and improvement of technology (9)
6. Less emphasis on short-term highly, visible projects and more emphasis on continuity of projects (9)
7. Support regional development organizations dealing with nonrenewable resources (8)
8. Identify alternative technologies to stimulate use of indigenous raw materials including recycling (8)
9. Clarify or understand host country policies and programs (8)
10. Technical assistance to LDC private sector for utilization of raw materials within the LDC (7)
11. Flexible and multiple approaches to resource development (7)
    a. let programs to develop without bias
    b. let best surface

12. International financial and technical cooperation for identification and development of resources (7)
    a. examination of development opportunity
    b. assuming LDCs do not have capabilities to inventory resource
13. Process resource in semifinished state in country of origin (7)
14. Relate social beneficial rate of use to maximum economic rate of exploitation (7)
15. Fair price for resources and adequate benefit for country--joint donor country-LDC programs to optimize LDC benefits
16. Wise use of unique nonrenewable land resources--beaches, island ecosystems, etc. (6)
17. Multination ownership and participation for resource development (5)
    a. better information for LDC on how transactions are negotiated
    b. gives better representation for each country
18. Approach development from existing need in social and economic structure (5)
19. Establish demonstration projects--extractive (4)
20. Encourage developmental climate thru indirect methods (4)
    a. encourage in international arena treaties, agreements, etc.
    b. create new needs
    c. development and improvement of technology
    d. expand or derive new knowledge
21. Development loans, grants, etc. (4)
22. Development on LDC marketing abilities (4)
23. Relate to other development programs (4)
24. Data bank on contractural agreements on resources--legal, financial (4)
25. Support long-range (50-100 years) studies (2)
26. Practical training in how to utilize resources--establish demonstration projects-extracting (1)
27. Development of substitutes for nonrenewable resources (1)
28. Development with or without regard to environmental impacts (1)

29. Expand or derive new knowledge (1)
    a. assistance on assessing and cataloging basic nonrenewable resources
    b. support collaborative research and survey on resource development
30. Favorable United States tariffs to encourage LDC manufactures from raw materials, i. e. aluminum products instead of ore (1)
31. Let donor countries do it all (0)
32. Leave resource undeveloped until LDC develops own capability (0)
33. Conscious programs of motivation (0)

Non-Renewable Resources (continued): Discussion

Parham: This working group broke into two sub-groups and came up with about 80 ideas. Some of them were very specific, for instance, what projects should actually be undertaken. We had some difficulties deciding whether we should be specific or general. This problem has come up in the other sessions as well. Whether we're dealing with projects or with general ideas is a problem here. In Littlewood's presentation and in the comments, soils apparently ended up on the shelf. Agriculture may have a big hold, but many trees grow on bare rocks. There are a lot of other positive aspects to soils not related solely to growing crops. This gets back to the problem of definition of renewable and nonrenewable resources. I consider soils to be nonrenewable. In many parts of the world soils are being destroyed, eroded, eliminated.

One of the comments that came from our group was that there is a strong need for assessments. Everybody in our group suggested developing a data base. More studies to find out what the needs are should be supported, they felt.

Lack of information on nonrenewable resources, lack of case histories is a problem area. I keep hearing this in relation to other AID projects. We ought to learn from our past mistakes. I don't mean just AID in Washington, but I mean AID generally. Lack of expertise and infrastructure in human resources came through in all cases, as well as lack of skills in international trade and finance, lack of planning for mineral industry processing, lack of university interest. I'm not picking on Arizona but it's true that in many universities there is little concern for nonrenewable natural resources in developing countries. Studies are almost nonexistent.

Under economic resources, lack of capital is a common problem. In physical resources there is a lack of advanced technology needed for mineral resource work.

Acquiring data is costly and time consuming. Because of priority rights, mining and oil companies don't release information gathered while they are in various countries. It is almost impossible to get that data for the use of the country. It's removed from the country, physically removed.

In the area of human resources it is noted that many times the developing countries do not follow up on a project once the advisers have pulled out--cultural antipathy towards manual labor. Field work is looked down upon.

Lack of national plans for development came through again and again. Policy decisions, plans and policies on all levels seemed to be a problem. And there is the status quo attitude. It was suggested that many times the people in a particular country like the situation just as it is.

Barriers in economic resources are money constraints, fear of exploitation--the developing country fearing the donor country's exploitation of them and conversely the fear of nationalization of the donor country's operations.

Physical resource barriers include climate, energy and the business of developing countries not being able to recycle their resources because the resources are no longer there. They were shipped out of the country. All there is left to recycle is a hole in the ground.

The issues came from the questions for a large part. What are the data again? What are the minimal requirements needed to operate a project? Does the developing country government see the need for collecting all this data? In human resources, there is labor-versus capital-intensive development. There will be needs for adjudication of disputes. We need development of long-range nonrenewable resource plans. Economic resources--pollution versus dollar benefits in developing resources need assessment. How do you protect your investment and at what rate should resources be developed? There should be equitable sharing of profits and benefits. Then who uses physical resources and what are they being used for? Can intermediate technology be used in mineral resource processing or does it have to be a capital-intensive operation? How long should the resources be husbanded by the developing countries? How should we maximize nonrenewable resource development but minimize dependence on nonrenewable resources. Should we try for a steady state in resource development? Are we going to recycle resources or are we going to open up new operations?

We got together then to formulate our ideas on what AID should do--strategies, policies, projects and we came up with 43. We narrowed it to 33. We voted. Some of items received no votes. We have here the top nine. Assistance in assessing and cataloging basic nonrenewable resources--what's there? Assistance in developing institutional capability for planning resource development and management--short collaborative research and survey efforts. Long-range systems planning should be applied to nonrenewable resource development. Development and improvement of technology should place less emphasis on short-term, highly visible projects and more emphasis on continuity of projects.

AID should support regional development organizations dealing with nonrenewable resources and identify alternative techniques to stimulate use of indigenous and raw materials, including recycling. The last one is to clarify or try to understand better the host country's policies and programs related to nonrenewable resources.

Johnson: Where you were referring to the lack of university interest, was the emphasis on the lack of the interest in the LDCs or in the United States?

Parham: I was referring to the United States' lack of interest.

Comment: We came from long distances with hopes that we will make some contributions to this valuable conference. So far, I find that we have not been able to do that. The purpose of the conference has not been clearly defined. I feel that there are many ideas we can contribute to this conference, given time for discussions.

Parham: I have to agree with that. We need a clear definition of specific goals when we get together in groups.

Comment: I should like to solicit comments from people who come from the developing countries.

Comment: It was very optimistic of us to come here and think we could define strategies within two days for AID in developing natural resources. The exercise is an innovation, I think. We found that the three groups are reaching similar points. I think that considering the way that this conference is designed we are doing the best we can do.

Comment: In each of the three programs the need for institutional strengthening was noted. What we didn't say is that the biggest barrier for development of many resources is the political one. It's not up to AID to develop the strategies to solve our own political problems. That's up to us.

In the case of Central America, as Ambassador Silva pointed out yesterday, our efforts to integrate five or six countries into an economic unit was potentially successful as long as we handled it from the technical and economic aspects--until the politicians got in the middle. Then we started to have problems and are having problems.

Why should this group recommend programs for less developed countries that have not been accomplished in the United States? If I understood right, that was what was behind some of the comments here this morning. I disagree with that. I don't see why we cannot do something now in our countries that has never even been tried in the United States or Europe. We may never do it, but we should have an opportunity to try it. As director of a technological institution I think it is our responsibility to try to innovate. I hope some day we can do something that the more advanced countries can copy from us.

APPENDIX II:

Plenary Session:

Reports from the Working Groups to Identify and Structure Categories of Interactions of Natural Resources Development with Technology, Environment, and Social Conditions

QUESTIONS AND COMMENTS, PLENARY SESSION

March 23, 1976

Dr. Robert Seale, Chairman

Ambassador Silva: Strategy. How best to develop LDCs, how best to utilize natural resources, is one topic. Quite another is what guidelines can be used best by AID to assist, cooperate with, help, promote the development of our resources? There has been some confusion, perhaps, in these issues.

Comment: Mr. Ambassador, I would differ on that. I believe AID, at least our office, does work in developing countries.

Arnold: I was just going to say the same thing. Within our capabilies we do try to use strategy guidelines in, for instance, the forest projects we have. They are designed to make maximum utilization of the woods within the countries, including processing material into finished products. There is a point, however, beyond which AID cannot go because of congressional policy and funding limitations.

[John] Fisher: I speak as a representative of institutional membership on the Consortium for International Development (CID). I have the unique attribute of having worked in the area of strategy development for five years in different countries. First, it is important that we differentiate between AID strategy and LDC strategy for development. AID's resources are limited. AID may not have the opportunity to participate in developing strategy in many LDCs because we are simply not there. Furthermore, if we are going to develop strategy, it can be done only in terms of specific goals or objectives.

When I was senior development officer in Ethiopia, I worked to develop the Desert Locust Control Organization for East Africa, a beautiful regional organization. We were beginning to develop the institutions and lo and behold, we had the desert locust invasion of 1967-28. I was at the Embassy where I learned that two U. S. Air Force planes with spraying equipment were bound for Ethiopia to help the DLCO. That act would have destroyed an organization confident that it could deal with the problem. It would have been disastrous for an external donor to come in and eliminate the locusts, you see. We got them stopped in Greece.

In the last couple of years, I have reviewed five five-year development plans and have had the pleasure of being involved in preparing them. There are some problems which we face up to, problems which I see surfacing right here. The first is that technicians tend not to understand the process of development very well, that is, what is involved in preparing a strategy, activities timing, or the compromises necessary. During one period, I brought in 23 short-term advisers. They suggested a variety of activities. None helped me very much because none listed development priorities, and resources were limited in the country.

Each country has to develop its own strategy, and to us most of those strategies are not rational, for a variety of reasons. AID organizations have not been very much help historically in terms of assisting host countries with their strategy problems. Furthermore, I think we must face up to the fact that it is one thing to recommend that national development plans be rationalized, but another to answer the question of how does AID help them rationalize that plan vis-a-vis all the pressures a country's leadership has to face.

Scale: The voice of experience.

We are now at the point where we must make a decision. First, I wish to make you aware of our plan. There will be a short summary tomorrow afternoon. At this time, the intent was to follow the same pattern as we did yesterday, i. e. set the sub-groups for later this morning and this afternoon. But from the tone of the comments it might be a good idea for Henry [Arnold] and some others to decide if we should change that schedule.

Malone: I think we will proceed with the sub-group plan.

Arnold: I think this has been a very good discussion, helpful in trying to clarify our directions. I want to take one small step in this direction now, hoping it may be useful. Yesterday, when I told you the purpose of this conference, I pointed out it was to identify gaps, barriers, and issues. Now I note that the first line on our program says "AID Strategy ..." I want to change that right now. From now on, let's call it "AID Pre-Strategy ..." I do not believe we have time enough to develop a useful, coherent strategy. We are getting out of the discussions all kinds of guidelines for someone to think about and to benefit from the many comments. So let me suggest that we think of it as a pre-strategy conference, and focus on gaps, issues, and barriers.

Comment: Sir, Pakistan has utilized AID perhaps to the maximum extent, as far as the East is concerned, up to 1969 or 1970. Since then, there has been some squeeze in AID because of policy changes beyond strategy. But we have certain big programs planned for the future. One is on the shelf now, involving land levelling which we anticipate will cost about $100 million in the next few years. We hope for help from U. S. AID. We are perhaps the biggest proponent of the AID programs and certainly want AID programs in Pakistan. Programs should be streamlined and made more effective. We are intent in Pakistan on improving upon our own systems. During the course of AID negotiations and implementation, however, there are times when we have very nice projects in our portfolio and we want assistance but the AID pipeline has dried up. At other times, we do not have particularly good projects and AID funds are available.

WORKING GROUP REPORTS AND DISCUSSION ON BACKGROUND SCOPING PAPER II

TECHNOLOGY

I. Technological Guidelines for AID Consideration

1. A concern in developing technical capabilities in LDCs is their ability to assimilate and apply the technology. We need some effective way to insure that.

2. Assimilation ability is, over time, responsive to education and training. Such education and training should be re-inforcing but developed in terms of the resource/economic base.

3. Since LDC personnel cannot all be knowledgeable about technology, the important aspect of their training must be methodology to be used in adapting to new and differing techniques.

4. AID should be concerned with institutional development to make rational technological choices, in addition to the education and training needs identified above.

5. The use of the spectrum concept provides a way to evaluate technology; e. g., where does a particular operation or production system fit on the scale?

6. The prospect of technology being utilized is important. Appropriate technology must be usable and have a reasonable a priority prospect of being utilized.

7. Appropriate technology should be eventually adapted to local conditions; i. e., certain aspects can be "researched" in United States labs but ultimately it should be improved and finalized in the field.

8. Labor intensity, (or other social values) should be given a value when determining technological choices; i. e., don't just use economic factors.

9. Labor intensity will lead to protectionism, high oil prices, and ineffective participation in world markets unless the industry is subsidized. Is subsidization

desirable? Are their limits? When are labor-intensive situations cost effective?

10. When considering labor intensity, the physical nature of the work as well as the complexity needs attention.

11. Labor productivity is more important than intensity alone.

12. A person's productivity can be increased through application of appropriate technology with eliminating the worker's position. However, if the natural resource base is limited, the net result over time may be a decrease in jobs.

13. Another factor is quality of the product. Use of a more capital-intensive alternative may be justified if it does a much better job. (Don't use a hand-drill in the dentist's office.)

14. New energy sources--wind, solar, etc.--should be given emphases in appropriate technology programs for arid lands.

15. More appropriately, the term "free" energy sources should be considered.

16. Technologies which employ available, unutilized energy sources should be promoted. Examples are wind or sun for water pumping or power generation.

17. Place responsibility for selection of subjects and approaches on those in the LDCs who will be responsible for making them work.

18. Our responsibility, then, is to assure the most comprehensive, systematic, and logical appraisal of basic conditions of all resources on which a program might be based.

19. How can AID assure the above? Some synthesis of information on AID's part, from a set of United States and foreign experts is necessary but not sufficient. A national comparison between the best available information and the project presented information is needed.

20. Specific tasks in technology transfer.

    a. New industrial methods to do work already being done.

    b. Transfer of knowledge and technicalities of resource exploration and evaluation.

21. The technology delivery package must be addressed in any proposal, and therefore can be a point of assessment by AID.

22. Develop some new approaches for resource-related technology; e. g., economical mineral extraction from sea water.

23. Where do the ideas for new approaches derive? Should there be an international body--or university centers--created to "dream" them up?

II. AID Guidelines on Technology Should:

1. Benefit maximum number of people

2. Address long-term goals--continuity with and without support

3. Have technology appropriate to base in human-technical conditions existing

4. Be efficiency-effective, benefits-cost, essential

5. Develop knowledge base in AID of technologies available for transfer

6. Be based on comprehensive knowledge of technological, economic, resource availability, market availability in project countries

7. Prepare LDC scientists, technicians, managers to make own decisions on programs, technologies, institution building

8. Introduce exploration-appraisal techniques

9. Introduce new methods and machines for improving productivity of existing institutions

10. Consider conversions to higher value products of resources existing

11. Seek resources available, not appreciated--wind, sun, water

12. Develop concept and practice of evolving technology paced by successful assimulation of and practice of each step defined for the long-term process... long-range programming

III. AID Should Further Consider the Following in Developing Technology-Transfer Guidelines

1. AID must maintain an awareness of the state of development of technology in the natural resource area so that appropriate technologies may be developed and utilized in LDCs.

2. Area considerations of the development of natural resources must be maintained because the market for products in small areas will be limited. This means many different resource developments should be stacked.

3. LDCs are, almost by definition, small market areas. Many resource development programs must be viewed in terms of export expectations. This would seem to limit technological choices to those internationally usable.

4. Ultimately, the facilities must sell outside the region on the world market. Potential for system modification and improvement with more complicated technology needs to be included.

5. AID should encourage LDCs to process at maximum raw materials and to export elaborated goods. There is no sense for LDCs to build cars when they are exporting unprocessed metals.

6. Someone has to export raw materials unless each country, developed or not, is self-sufficient in all materials.

7. Prior to selection of a particular project, a broad plan needs to be developed so that individual projects can be judged as part of the overall picture. The overall plan should be communicated to project initiators before projects are submitted. Cultural and societal as well as environmental impacts should be anticipated.

8. Any technology "new" to the country is going to leave impact on cultural and societal concerns; i. e. change is the desired result and everybody must face it.

9. Technology can be "designed" to have lessened impacts on society with greater impacts on productivity.

IV. Sucessful Technology Transfer must address:

Resources known to exist (renewable and nonrenewable, human-social, cultural)
Resources that might be discovered (natural)
Resources that might be developed (human and cultural)

1. Technological advances should be employed only to the extent necessary to do a particular function which cannot be reasonably and effectively performed by labor-intensive methods. Specifically, heavy tillage operations by machinery may be obviously necessary to increase production whereas harvesting should continue as a labor-intensive effort.

2. Added to the above are those resources which should be converted to satisfy the priority needs of the people. In other words, what specific products are in greatest need?

3. The primary concern of selection by AID should be that the technical project proposed and projected should increase the "well being" (economic, social, health, etc.) of the maximum number of people.

4. Economic return is not necessarily "old fashioned." Where does money for "social profits" come from? Somebody has to produce more than he consumes.

5. Long-term productivity is most important. Question of what would happen if project were greatly expanded should be considered.

6. Appropriate technology should mean development by hand and later through sophisticated systems as conditions dictate.

7. Efficiency is certainly important. Must get best return (return can be defined in many ways) for the investment.

8. AID should ask technologists to set forth for each activity all technical feasible alternatives to be costed in terms of the country in which the activity will take place.

9. For some technological areas the state-of-the-art (SOA) is well defined and the meaning of intermediate technology is clear. For other areas, the SOA is not well defined and the meaning of intermediate technology ambiguous. AID needs SOA studies in some areas to be able to define more precisely intermediate technology.

10. The SOA must of course be set within the confines of specified conversion systems. Appropriate technology in one system may be sophisticated or low with respect to others.

11. How does an LDC come to know the "state of the art," particularly when covered by patented or secret processes? Should an international body developing technology to be available to LDCs be suggested?

12. Multidisciplinary area planning by a knowledgeable group is needed to determine appropriate technology to bring about the changes for upgrading conditions in an area.

V. Labor Considerations to be Incorporated in AID Technology Guidelines

1. Can more attention be given to utilizing seasonal labor cycles in choosing technologies; i. e. the "double-cropping" principle, but applied to labor in LDCs.

2. This implied matching cyclical labor availability with multiple production efforts, a match which is frequently difficult to achieve however desirable it may be.

3. In general, availability of labor (untrained or with mine training) does not seem to be the crucial issue, but rather how to provide maximum employment opportunities to the labor force. Also employing seasonal and/or migrating labor is very wasteful in terms of energy resources, since their transportation for relocation is wasteful.

4. Problems with labor should be treated in both ways. You have to use more labor but you also have to improve the labor products. This is to get better results from them by the use of some tools and machinery.

VI. What Kinds of Technology Should AID Consider?

1. Technology should be proven; i. e., operational in the United States or developed countries, not glamour stuff to waste LDCs time and money.

2. Technology should be used at the appropriate level. Remote sensing and micro-wave or satellite communication is not necessarily bad, however.

3. If you use satellite imagery you have to provide the LDC with the computer programs and computer to interpret the imagery.

4. Satellite communications technology can be used to transfer agricultural technology or provide basic education without extensive computer facilities.

5. Once you have all this information, do you know how to use it? We need to have strong educational programs (extension, etc.) to go with these "theoretical" means to provide practical field education.

6. New technology such as ERTS imagery, though of less immediate interest to United States users because of the advanced levels of domestic conventional data gathering systems, can be of significantly greater value in the new-term to LDCs for they lack for the most part the kind of data about themselves that we take for granted here. Imagery may be used valuably in relatively

simple or "status" modes and not in the sophisticated "dynamic" way that even United States users are using only experimentally.

VII. Criteria for Selection of Projects:

1. Avoid long-term dependency

2. Include local R & D so that dependence on external proprietary processes is avoided

3. Potential for replication of units so massive impact is ultimately possible

4. Opportunistic and responsive to local enthusiasms

5. Many countries think suggestions intermediate technology are plots to prevent them from catching up or competing with developed countries.

6. The technology transfer should be appropriate for the LDC. This means if you have a computer program used in the United States, have an engineer study it in the United States and then he should "translate" it to his native country language and needs.

7. Appropriate technology is only "appropriate" when it is generated by the developing country. We in the developed countries can only hope to respond to the needs, as they see them, of LDCs with our research capabilities. We can also make known to decision bodies alternatives in appropriate technology.

8. Programs should be developed which make minimum use of fossil fuel sources.

9. Results in reasonable time may depend heavily on use of fossil fuels for lack of economic and technologically simply alternatives.

10. Is this an absolute or just "convenience" lack of alternatives?

11. Technology is a "spectrum" and the entire spectrum should be considered in choosing alternatives.

12. Fossil fuel should be used by the country in a needed way. Or is it better for a LDC to save energy and have the people hungry? Who is this LDC saving fuel for?

13. Energy requirements of any technology must be considered in long-range plans. Avoid technology that will only have short lifetime.

14. Technologies of low energy requirements should be given preference over high energy consuming technology. Specifically water distribution systems operating as open surfaces should be preferred to high pressure systems such as sprinklers or drip systems.

VIII. What Technological Guidelines Should AID Consider?

1. First and most important technological problem is how to move with good, fast and appropriate technology transfer from the developed countries to the LDCs.

2. Technology includes management and therefore appropriate technology management systems should be included.

3. How do the developed countries really know how to apply "appropriately" their technology to the LDCs. One should not forget that the developed world is itself undergoing a serious process of rethinking and reevaluation of their ways of doing things. If this process is becoming more advanced, then, and maybe only then, might these countries also have learned how best to adopt and accomplish technological transfer.

4. Centers are being developed for implementing appropriate technology programs. AID should make use of them as well as support them.

5. What we really need is to develop a "cadre" of intermediate technological people in the LDCs, who can act as the go-betweens between the Ph.D. levels to the peasant level in the field.

IX. What Technological Guidelines Should AID Consider in Assisting LDC Development of Natural Resources?

1. Equipment performance shall be governed by human effort rather than by automated process to the fullest extent possible consistent with quality control and efficiency. Maybe with small amounts of capital investment and no reduction of labor, productivity can be greatly increased.

2. Labor intensity must not be considered to the exclusion of all else. In all cases output/input efficiency should be assessed.

3. There are an almost infinite number of technological possibilities. Can these be simulated to reduce the number actually to be considered in any specific situation to a manageable number to be analyzed in terms of feasibility, cost, etc.

4. Potential for productivity increases with either capital or labor must be tied to market growth.

5. The ability to measure the level of existing technology is needed so that project efforts can be directed to areas of greatest need and to projects that will return the greatest benefit for dollars invested. Also, the measurement can be used as an indication of the impact of a completed or partially completed project.

6. Technologies aimed at utilizing local natural resources should be fostered. Specifically the technology of the cooked clay (brick) industry should be promoted throughout areas without other known building materials.

7. In utilization projects base line studies to permit later analysis and evaluation of results should be encouraged.

8. Promote technologies to make construction materials and practices more relevant to the local conditions and resources are important; e. g., stabilized-adobe for earthquake areas.

9. Where a technology has the potential of wide-scale and pervasive impact on natural resource development and conservation such as in the case with earth resource survey satellites (ERTS) AID should consider ensuring the continued availability of that technology, the continued availability of its products at costs that are within reasonable access of LDCs capacity to procure them, and the diffusion of skills to permit LDCs to assimulate the technology at a pace consistent with internal needs and capacities. AID's mandated orientation towards intermediate technology should not be allowed to exclude attention from a high technology, and commitment of significant resources to it, if it can be shown to have wide, long-term potential, but requires substantial, sustained effort to realize its ultimate benefits.

10. AID should make attempts to present technological options for natural resource development according to local (national) policies and priorities.

11. While the average goal is appropriate technology each facility should have a range of sophistication to build technical capabilities within the LDCs.

12. What is an intermediate technology in one place may be a sophisticated technology in another place, and low technology elsewhere. Hence, the relative sophistication of the technology becomes a matter of appropriateness to the specific situation.

13. The level of the society to which technology is disseminated depends on the type of technology and some judgement about who is best equipped to use it. For things like improved cultivation practices it is obvious that technology must be transferred to the farmers to have impact. For more sophisticated technology transfer to only the federal government level is appropriate. For some new technology, most effective use may be made at the multinational level. AID should encourage multinational cooperation and consider this factor in project evaluation.

14. LANDSAT imagery is appropriate technology under some circumstances--assessing progress of monsoon rains, etc. But heavy emphasis on data systems should not overshadow prospects for data utilization.

15. The subsistance-level agricultural sector requires simple, yet efficient pumps (human or animal operated) to help irrigate fields and outlets to sell products at a fair price, which will promote interest in producing agricultural surpluses. Thus marketing and distributing organizations are important.

Technology (continued): Discussion

Matlock: We addressed the question of what technological guidelines should AID consider in assisting LDCs with natural resources development. The overall thematic guideline emerging was that all technology should be appropriate technology, following which we attempted to define what we meant by this term.

To begin with, we said appropriate technology includes management as well as production or mechanization aspects, i. e. methods as well as simple tools and machines commonly associated with the concept. Projects should therefore consider appropriate technological management systems.

Second, appropriate technology emphasizes local social, political and economic goals as expressed in local priorities, policies and enthusiasm. It meets local needs, it is within local capability and uses local resources, human and natural. It may include local research and development, while avoiding a dependency relationship. Projects should therefore have local emphases.

Third, other factors to examine in selecting an appropriate technology in most cases involve trade-offs. Seven major factors identified in our discussion: labor, economics, productivity and quality of output, indigenous technology, natural resources, safety and health, and overall development plans. Specifically:

- It is not always appropriate to consider labor-intensive projects. While this factor must be taken into account, along with all other aspects, the availability of labor, on both long-term and seasonal bases, and the technical competence of available labor must be evaluated.

- Economic factors include capital requirements and availability, market conditions (both local and foreign), and economic efficiency of production.

- Any appropriate technology will increase labor productivity but will also be concerned with quality. Quality control should be written into appropriate technology projects.

> The effect of any new technology on indigenous technology must be weighed. Is the indigenous technology at a lower or higher level than the appropriate technology being introduced?
>
> Projects should involve or should consider the optimum use of non-renewable energy sources, e. g. fossil fuel should be used wisely. But there should be increased use of new and unutilized or underutilized sources of energy such as solar and wind power. We have, then, a caveat that we should avoid short-lived energy sources unless they are means to an end and their limitations well understood. Although technology may be developed based on oil today because it is the only choice available, it should be done as part of a long-range plan to bring other alternatives to the fore.

Fourth, there is a range of technologies which is really a continuum, a spectrum, if you will, which demands methods for measuring or assessing technology levels for existing or proposed projects, for ongoing project evaluation and for determining technology transfer effectiveness. Because of the infinite range of possibilities available, there is a need to reduce the scope to a small set of alternatives for decision makers.

Remote sensing and use of earth satellite imagery is obviously high-level sophisticated technology, but under proper circumstances it may be considered an appropriate technology. Projects within a single country, or activities within a single project may be a different technology levels. Furthermore, different levels of technology are appropriate for different target groups within a given country. The level of technology used, for example, in working with farmers may be quite different from that used in dealing with a governmental agency or group with more sophisticated comprehension. Research should be initiated, therefore, to develop ways to measure and assess technology levels.

Fifth, implementation of appropriate technology requires special effort. There is need for a cadre of trained appropriate technology specialists able to translate the technology and serve as liaison between those who develop it and those who will use it.

There is a particular need for local adaptation of technology. Extension institutions should be established using the previously mentioned cadre to serve in this extension role. Other extension activities needed would include demonstration projects to show what can be done on a local scale.

Implementing appropriate technology calls for information dissemination to prevent us from re-intenting the wheel everywhere. There is need for state-of-the-art studies in appropriate technology which might serve to dispel the second-rate technology image that appropriate technology has in some places.

Implementation of high-level technology such as remote sensing or a comparable level, if appropriate, requires adequate and continuing support. AID, therefore, should support and use existing centers where appropriate technology is being developed in LDCs.

Comment: I'm Ray Fary with the U. S. Geological Survey. My responsibility is in the remote sensing program. In terms of vehicles and instrumentation, remote sensing is high-level technology, but actually simplicity is the heart of the LANDSAT/ERTS concept. It was not intended to be a new technology and it certainly is not a new science if you are a physicist or an engineers. The data were expected to be used photographically. That is the principal media in which data are distributed because data should be immediately useful to any practicing scientist needing information on the conditions of the earth's surface.

I have conducted training programs in regions where we had only a few weeks to explain the concepts of the system, what we expected to get out of it, and then putting data in the hands of scientists to use, and eventually getting back reports on its value.

If you look at the NASA experimental program you will find that this is precisely what it is. We did not begin with certain knowledge of what we were going to get out of it or how. We know that the space vangage point has unique value for observations. We knew that newly developing instrument systems provided an opportunity to see things in a different light. Our purpose, at this point where we started, was to define applications. We needed not only our own experience but that of everyone who will work with the data to tell us what their values are, how they can be improved. Through AID projects we have been able to reach a great many people. Generally these are short-term introductory programs. So far as our involvement has been concerned, it has been simply to get others started using the data on their own. No one should be sitting around waiting for an opportunity to take part in some special training program. No matter what the computers will do for us, these are still going to be the key elements in the system: brains, eyeball, and professional experience.

Question: What is AID planning to do in the field of appropriate technology?

Arnold: My problem is answering your question is that my definition of appropriate technology probably is different from yours and from everybody else's. I would say that AID is attempting to find out more about the nature of the needs for simple technologies in rural areas so we can develop programs for disseminating information more systematically and for training people. Tom Arndt is heading up a study group now, and we expect to come out with some answers shortly. But that is only one effort. Ross Hammond has been engaged in intermediate technology, simple technology, for the past three years. His program involved linkages with half a dozen or more institutions worldwide. And individual consulting services in rural areas are available.

Question: I should like to know where I go if I am looking for intermediate technology in agriculture, intermediate or simple technology.

Arnold: At the moment you go to Tom Arndt or me, or the agricultural people involved.

Matlock: Through our 211(d) program at the University of Arizona we are developing intermediate technology applications and hope to have program activities in that area soon.

ENVIRONMENT

I. What Environmental Guidelines Should AID Use in Attempting to Assist LDCs in Developing Their Natural Resources?

After a change in question, this group divided into two sub-groups for the brainwriting session, following which there was a cross assessment and a synthesis of the two groups' thoughts. The outcome of discussion was identification of our basic points which in the process of discussion seemed to bear on AID activities in general not just those relating to natural resource development, but more to recommendations for actions to be taken by AID as opposed to subactive guidelines.

II. What Environmental Considerations Should Best Concern AID in Attempting to Assist LDCs in Developing Their Natural Resources?

This statement evolved from the original question, I, above, with the following recommendations:

1. generate an increased awareness within AID of the importance of environmental considerations in the choice, design, and implementation of projects to be assisted

2. improve AID capabilities to undertake environmental assessments

3. interaction by AID with LDCs to gain their understanding of AID's environmental concerns but with emphasis on joint consideration of environmental factors at all stages in the formulation and implementation of development programs

4. assistance from AID to LDCs in improving their capabilities to participate and eventually undertake environmental assessments

III. Under these general headings, numerous individual suggestions for specific activities were made:

1. Awareness

   a. adoption of clear policy, which has been done

b. adoption of procedures for carving the policy, which is in process of being done
c. in-house education and information programs using expertise if necessary

2. Capabilities

a. include a limited number of environmental specialists on AID's staff to provide the preparation and to evaluate environmental assessments
b. generate various types of guidelines for different program activities: i. e. water development, renewable resource development, nonrenewable resource development, etc.
c. incorporate environmental considerations into the agency project design process, project evaluation, and also require post-project monitoring of identified possible adverse environmental consequences by host governments

3. Interaction

a. joint AID-LDC meetings to discuss and achieve common understanding of AID environmental policy and LDC concerns and priorities
b. joint workshops to upgrade understanding of both AID and LDCs
c. continuous AID-host country consultations on individual project design and on overall development programs
d. utilize data developed locally partly by AID and host country

4. Assistance

a. assist LDCs in developing institutional capability
b. assist LDCs in developing technical competence

IV. General Concerns Raised

1. Need to work with other donors to develop uniform environmental procedures, harmonize approaches, and exchange information

2. until environmental assessment becomes an accepted integral part of project design, additional costs of

environmental assessments and who will bear these costs may become an issue

Environment (continued): Discussion

Kux [Rapporteur]: The group that considered environmental problems was given a question by our facilitator which reads, "What environmental considerations should concern AID in attempting to assist LDCs develop natural resources?" I found that we really didn't answer that question at all. Instead we came out with a rather general outline of concerns which AID should take into account to meet its environmental policy. We divided into two small groups, went through a brainwriting session, followed by a cross-assessment session. Then we tried to put the two groups of suggestions together. There are 39 items which ranged all the way from very broad concerns and broad policy statements to specific suggestions. It was agreed at the end of the meeting that we could synthesize these statements into four basic suggestions to AID. These are the four broad areas.

1. To generate an increased awareness within AID of the importance of environmental considerations in the choice, design and implementation of projects to be assisted

2. Improve AID's capabilities to undertake environmental assessments.

3. Interaction between AID and LDCs to gain their understanding of AID's environmental concerns at all stages in formulating and implementing development programs.

4. Assistance from AID to LDCs to improve their capabilities to participate in and eventually undertake environmental assessments.

Under those four general areas I have tried to put the various individual suggestions. The sub-headings I am going to read are really not a complete representation of all the individual ideas that stood out as most important.

In the environmental awareness area, AID needs to adopt a very clear policy and procedure to implement that policy as well as start an in-house education information training program. We are well aware that AID is not now fully equipped to do this.

Area two involved improving AID's environmental assessment capabilities. A limited number of environmental specialists should be added to AID's staff to guide preparation and evaluation of environmental assessments and generation

of various guidelines for program activities such as water development, renewable resources and nonrenewable resources. This could expand into many different areas including incorporation of environmental considerations in the agency project design process, in the project evaluation process and post-project monitoring of identified environmental consequences that may occur. These tasks should be undertaken by host government agencies or whoever is capable.

The third area appears to be one of the most important concerns in our group. It was the need for interaction between AID and countries assisted. We felt it was very important to have joint meetings between AID and host government personnel to discuss and explain AID environmental policy to reach some common understanding with respect to that policy and LDC concerns and policies. Continuous AID-host countries consultations on individual project design, project choice and overall development programs are needed. Possibly in the five-year development assistance programs utilization of locally developed data could be developed jointly by AID and the host country to make environmental assessments.

Under area four--assistance by AID to LDCs--there is a range of suggestions that we could have added. The main areas were developing institutional capabilities in LDCs and providing technical assistance wherever needed.

In addition to those four areas there were some areas of general concern discussed. I think the most important ones were the need to work with other donors to develop uniform environmental procedures, harmonize approaches and exchange information. It seemed logical that it would be easier for recipient countries and for AID if this procedure were followed by other donor agencies in a uniform manner.

The second point was that until environmental assessment becomes an accepted, integral part of design within AID and recipient countries the issue will be who is to bear the additional cost of assessment? That is something we all have to think about, those of us who have been working on AID environmental problems over the past three or four years. The results of discussions were very heartening because they track very well with a recent AID policy determination adopted in August (1975). It has two basic formats. One is that AID should look at all projects it assists to make sure that environmental consequences are taken into account in making decisions and secondly that we assist developing countries to develop their own assessment capabilities. That policy determination is being translated into agency procedures. If any of you are interested in either of those two formats we would be happy to make copies available to you or perhaps we could attach them to the strategy meeting report.

Comment: I think you ought to take a minute to describe the other efforts currently underway for training and providing environmental assessment backup--what management is and all its functions.

Kux: We have started an internal AID training program. We've requested the Brookings Institution to conduct seminars for high-level AID people. Four seminars have taken place in the United States. We plan to take this program overseas to work with mission directors and their counterparts in host country institutions. We hope to have a series of regional overseas seminars starting by next summer or next fall. We are trying to arrange with the AID training office incorporation of an environmental element in its training programs now in project design and review to give these people some feeling for the subject and the problems. It wouldn't be an attempt to make them environmental experts but at least to make them aware of the problem and provide a means for looking at it. We are also in the process of planning and designing technical assistance programs in the environmental arena aimed at specifically helping countries build institutional frameworks for environmental management in their own countries. Are there any questions?

Comment: I'm concerned because when you cite AID policies you don't say if the LDC is interested in this business on environment. In other words it sounds like policy is made without consideration on whether they give a damn or not. A way of assessing whether they give a damn or not is to let them pay a small percentage of the cost. You'll soon find out if they care or if they are just bowing because it's a policy.

Comment: I'm concerned on this point too because unfortunately AID has a way of including a number of requirements which become additional irritants when dealing and negotiating with a host country. I realize your point about who is going to pay for it was very appropriate. We came up with a loan for small- to medium-scale irrigation project, and at the last moment an environmental assessment was written in by AID/Washington that the Peruvian government was going to pay for it.

Kux: Would you like to answer that?

Comment: Let me answer this bit. This is a very interesting and important question. The policy is clear. AID believes it must take a position of leadership with regard to resources and environment in everything we do. We didn't do this lightly. We didn't do it without recognition that it would be a traumatic affair. We didn't do it without recognition that it would add just one more burden on the field missions. But we did it after much thought about our responsibilities and how we should carry them out. So we said, there isn't any half-way point about it, there isn't any "we'll do this if it doesn't get in the way." We have to recognize that there are going to be impacts, arguments and problems that aren't solved--like who is going to pay for it. It won't happen all at once.

But the agency's policy is serious. It says, "We are going to do an environmental impact analysis, assessment on every major action of the agency including projects, but not restricted to projects, which may have a significant impact on the environment. And to the extent possible we are going to do this in collaboration with the recipient countries." There may be exceptions for reasons

of foreign policy, for reasons of emergency. There are the usual caveats which we hope will make it possible to implement this policy with some reasonableness. But if a country doesn't want to participate in thinking about the environment, and of course we can't make them participate in thinking about the environment--they may have some other view about it entirely--that may influence whether or not we participate in a particular project because we believe that the environment is important. We were pushed very hard by environmental interest groups and by the Congress to prepare environmental impact statements for every major action that may have a significant impact. We said we are not going to do that. We don't believe we should do that because that involves publishing an analysis not only for U. S. government agencies' comments but for public comments. Public comment usually takes 45 to 90 days. Impact statements shouldn't apply when the impact is contained within a given country that the United States has nothing to do with except through a foreign assistance program. So we are not going to do it, but we will make an assessment. We will make it to the best of our ability given the fact that the data base may not be adequate and given the fact that it may be you can't turn people on with this idea just like a light switch. It may take years to develop both our competence and their awareness and cooperation, but we'll do it to the best of our ability starting immediately.

This doesn't say that if the impact is adverse we won't do the project. It simply says we make an assessment and crank it in just as we do the cost of a project or the benefits or the social factors. It says that assessments will be made and considered. It's a difficult area. We are going to make assessments even though other countries may not be interested in doing so if the project is important, if it's significant. The degree to which we will be stubborn probably will depend upon our impact assessment. If it is an irreversible and serious impact we probably won't begin a project unless we have participation of the country. If it is a minor impact we'll use our own judgement.

Comment: May I have some factual information about that please? Does NEPA exclude AID from its regulations? Have courts ruled on it?

Comment: NEPA does not exclude AID, but AID says NEPA does not apply. The courts have not ruled on that particular point. We have postponed that ruling if not eliminated it by admitting we really have some responsibilities we haven't been carrying out.

Comment: What is the role of the United Nations environment program in LDC programs?

Answer: Its responsibility is to deal with environmental issues of global and regional importance. They are not to use funds to assist countries with specific problems except as those problems can be dealt with as a demonstration or case study. They do have limited technical assistance funds and hope to set up an environmental clearing house for technical assistance. Limited funds are available, for instance, to assist a country with a specific set of environmental

problems associated with a project such as a dam project. And the United Nations will help countries set up international institutions. I think these are the general guidelines.

Question: ... such projects as the central Senegal River project which involves several different countries and quite a large region?

Answer: They may make technical experts available. This is still somewhat of a gray area. The guidelines are that the United Nations environment fund is not to be spent to deal with countries' specific regional projects.

Comment: One other point I'd like to make. The NEPA does apply to all U. S. agencies including AID. So under NEPA, AID, as is the Corps of Engineers, is requested to systematically assess the environmental aspects of its projects. Now the issue, with respect to NEPA and AID, was section 1022C which requires an environmental impact assessment which then would be made public. That has been debated over the years. It is hoped that this new policy statement will be accepted by the public and everybody who looks at it. It may resolve the issue.

Kux: Mr. Masnick.

Masnick: I think that this matter is of concern to all of us. In the field you see concerns and even suspicions of host countries of which we should be very much aware. Many industries, highways, ports and other projects have been developed in industrialized countries without much concern for environment. If very high environmental protection standards are applied then to projects in LDCs they feel that it might be a manipulation of some heathen hand to prevent development. It is not that I back that opinion but it is something I think we should be very much aware of.

The interaction of AID with LDCs for joint studies and joint analyses to promote awareness of the needs to protect the environment, especially in projects which destroy forests or pollute water, is of importance. But it shouldn't be overdone. Smaller projects like the irrigation project in Peru or the training program in Costa Rica will cost much more because statements of environmental impact will be required. These will have to be done by consulting firms which will have to solicit competitive technical proposals from different firms to be received in 90 days, to be analyzed in another 90 days and then to be awarded. That takes one year sometimes. So it normally adds to the time factor in making a project. If the country is not convinced that this process is necessary then it views the coming of consulting firms as a necessary evil. The consultant firms comes, makes its small report, charges $200,000, the report is left there on the shelf and the project is tied up. It leads to a lot of bitterness. Host countries believe that AID is promoting jobs for consultants at the expense of the LDC. This whole thing should be very well understood.

Comment: That's of course a very important point. Let me make two comments on it without detracting any from it. One is that the AID program is committed

to the awareness angle that you speak about and to making sure that to the best of our ability, within reason, and with the participation of everybody involved, that there is knowledge not only of the possible impact of the proposed action, but that there is a serious attempt to examine alternative methods of carrying out the project. As Leonard Berry put it yesterday, a better project may result because of the environmental considerations. The next point is that AID's policy does not address the question of standards to be applied in developing countries because we are not talking at this point of anything except making the environmental assessment. We are not talking about standards or regulations to be applied here or there along the way. The third point is that it's clear that if we are going to take this position we also have to take the position that foreign assistance programs have got to be beefed up with additional money to pay for these assessments.

Comment: Environmental assessment at a time of great change seems to be somehow questionable. We expect the changes in LDCs to be quite dramatic in the next 50 or 100 years. If we make an environmental assessment on every little change it's meaningless. For instance, I have a comment about the great environmental impact on New York when the automobile was developed because they wouldn't have to clean up this vast quantity of horse manure which was being accumulated daily in New York. It was a nonsense statement because times were changing too fast.

Kux: Would someone like to answer that question?

Comment: Well, I think, we have to look at it from a slightly different point of view because NEPA does not say what you have to do in terms of standards. And NEPA regulations are for this country. NEPA only says one general statement and it is that any action by any agency or membership of the federal government has to be analyzed and looked at in terms of its impact on the environment. It is definitely the thing which has done a lot of good for this country, if not in terms of capital cost and otherwise, but in terms that we have learned to look at alternatives. In our technology sessions yesterday one of the big factors was looking at alternatives. I was not conscious of looking at alternatives before this happened. We've been playing with it during the past five or six years. That is the big idea of NEPA. It is not to tell some other country what standards to use because NEPA doesn't require any standards. NEPA causes you to think in the most optimum way slanted towards preservation of our environment and that is globally. That is really what NEPA does. I think that AID is doing its job without imposing its will onto the people where it works. But AID is there, selling it, because it is public policy.

Comment: Alan Jacobs has been in this business longer than most of us with AID. Why don't you say something, Al?

Jacobs: One geographic area has peculiarities which make it different from others perhaps. It's an area in which we have quite a bit of time working and thinking about how to achieve some of these mandates or requirements. We

have faced this problem and we are facing it. We are getting statements indicating that perhaps the host country doesn't have the same interest and doesn't wish to go ahead in this direction. We have had both of the problems and confronted them. This regional bureau has decided that, for a number of reasons, there has to be funding for environmental work apart from project funding. Often funds are needed before there is really a project with identifiable funds. So, therefore, we have decided that we have to have a certain amount of annual money to put into the country or the mission for analyses of environmental concerns. On the other hand, we have decided that in each of our host countries there is a very fragile but genuine interest in the environment. This interest is not always connected with the people who develop projects. People with interest in the environment who are promoting the idea of examining alternatives are standing a little bit away from the actual concerns of ministry of interior, or minister of public works. We would like to nurture those people.

We believe there is no way to do this work except in the country with minimum U. S. input for a good many reasons, not just the reasons of country pride or interest, but from a standpoint of practicality. You can't call from the United States an expert on the spur of the moment as needed. It just doesn't work. The missions we have need experts to talk with, to discuss these matters with, early in project design or project choice.

We feel that even though the people we are lending money to say, "Well, we're not very interested in putting in this loan a provision that calls for us to borrow money to pay for an environmental impact study." We say, "Okay, we'll ignore that." We'll put our money into the host country organization and then try to get them to adjust priorities on various projects. In other words, if the host country's environmental organization feels that there is a real need for an earnest examination of a project apart from the one we're talking about and to minimize our project, then our assessment is going to reflect that priority and we're not going to examine with such great care. That may not track completely with NEPA's intent but it tracks with the intent of making a sensible and careful examination of all the activities in that country. We are going to bring this out in our examination.

We are starting to see development of a group of concrete environmental teams 99 per cent composed of host country specialists. They will be on call to us, will be helped by us, with a resident leader for our purposes and helper for the host country's purposes. We've examined these areas. We believe there are 15, 20, maybe 30 individuals who will be constantly working on projects paid for by us. By virtue of that there will be strength given to the host country, powers and abilities to observe their own environmental activities.

Kux: There is time for one more question.

Comment: I endorse two things said. First of all is Alan's idea of getting in early in the planning, design or pre-project stages. It is very important because at that stage the host government will see it as being of positive help.

They are just as interested as anybody else in getting the best and maximum use out of their own resources. But if you short-stop a project in the final stages after it's been in gestation for three years, they can only view AID as being a major roadblock and not interested in their country's well being. It seems to me sensible application of this policy which Alan was stressing is what we should do in AID. If a project is far along perhaps AID with the agreement of the government might want to finance some sort of assessment but not hold up the project. AID should insist rather vigorously at an early stage of a project through its education and joint communication programs that assessments should be built into basic project design. I think if this regulation is handled this way AID can emerge looking mutually beneficial to the host country and to U. S. agencies.

Comment: The tendency in writing procedures has been to try to push the whole thing back as early as possible, into the "pit" stage of discussions. Everybody is going to get a chance to comment on this.

Comment: Again I agree that often you have the project and it is not a project per se. It either goes through an intermediate credit institution, or it is in process. We did not pick the 20 projects that will be done. We have developed a process for picking the 20 projects. In that case you really can't do it ahead of the loan.

Comment: All environmental problems and solutions are global. I feel that the environmental problem in LDCs is not their problem, it is a global problem. For the LDCs sometimes it is difficult to spend a lot of money on environmental considerations when there is hunger and unemployment. So I'm thinking that this discussion should lead us to suggest the more developed countries, the industrialized countries, pay a larger share of the costs of the global analyses and assessments and of implementing solutions of environmental problems.

SOCIAL CONDITIONS

What Social Issue Guidelines Should AID Consider in Assisting LDC Development of Natural Resources?

1. Philosophy: Social science emphasis should focus on how to improve the socio-economic systems through resource development rather than measuring adverse impacts of development projects and perhaps devising some means to reduce adverse impacts as add-on projects

2. Research Needs/Programs

   a. understand the implications of population dynamics in relation to proposed development programs: migration, natural increase rate effects
   b. political concerns, understand the stability of reigning development policies and AID interests vis-a-vis "marginal" non-official groups in host countries, i. e. possibly environmental groups
   c. data/information base; acquire disaggregated social/cultural data:
      - per capita income
      - life expectancy
      - education levels
      - health indicators
      - access to information (media)
      - literacy
      - stress indicators
      - unemployment
      - migration patterns
   d. re-evaluate social science tools and methods to enhance their capability, especially to determine western/industrial country biases
   e. determine what motivates cultural groups to innovate. What are the cultural-specific methods of innovation? Who are opinion leaders?
   f. establish the indigenous capability to determine social/cultural wants, n eds, desires, and strengthen that aspect of development input whenever possible

3. Education: Indigenous LDC Populations and AID

   a. AID should recognize that nomadic societies may be essential in certain geographic regions
   b. education systems should build the capability to train indigenous social science expertise through LDC-DC cooperative ventures, even if so doing adversely affects conventional cost/benefit ratios
   c. evolve social indicies methodologies for difference socio-economic settings
   d. AID should acquire experts from "typical" LDCs to assist in problem evaluation and problem solving

4. Development Projects/Goals

   a. use the "beneficiary group" of a program to assist in program design, as well as third country representatives
   b. design projects so that the perceived risk, especially economic risk, to the beneficiary groups is minimized
   c. increase sensitivity to the goals of host country governments to decrease the possibility of conflict between project teams and national leadership
   d. design projects with least change in existing social patterns, so that rate of change will generally be slow and within the framework of their ideology systems

Social Issues (continued): Discussion

Bloom: John Dettloff is rapporteur for the social issues group.

Dettloff [Rapporteur]: The social issues group spent the morning attempting to develop a philosophy of what we were trying to do here. I hope I have captured it in the following statement. Social sciences emphasis should focus on how to improve socioeconomic systems through resource development rather than measuring adverse impacts of development projects and devising, perhaps, some means to reduce adverse impacts as an add-on project. There is clear recognition that almost any development project is going to affect social conditions. However, analysis should proceed from the host country.

In the afternoon the group considered a series of comments which fall into several categories. One is to attempt to understand population dynamics with respect to the implications of proposed development programs--that is, migrations.

Second were political concerns. This is, perhaps, a little bit touchy. Attempts should be made to understand the stability of development policies in host countries and to define AID interest vis-a-vis marginal or unofficial groups. The example of environmental groups in the host countries is probably a good one.

Next is data base information acquisition. United Nations data seem to cover whole countries, perhaps regions, even. It was felt that data should be broken down to province level or something of that nature. We have a list of 10 to 12 of these data categories. There might be 40 more. I'll read some of them: per capita income, life expectancy, educational levels, health indicators, access to information, stress indicators, unemployment and migration patterns.

Fourth, re-evaluate social science tools and methods to enhance their capability, especially to determine what western or industrial biases exists in the tools.

Fifth, determine what motivates cultural groups to innovate. What are the specific cultural methods of innovation and who are the opinion leaders?

Sixth, establish the indigenous capability to determine socioeconomic wants, needs and desires, and strengthen that aspect of development input where possible.

The research category is the longest, perhaps reflecting an academic bias. Next was a basic category which could be lumped under education. This means education both in LDCs and in AID. First, AID should recognize that nomadic societies may be essential in certain geographic regions.

Second, education systems should build the capability to train indigenous social scientists through LDC-developed country cooperative ventures even if the conventional cost-benefit ratios are adversely affected.

Third, evolve social indices methodologies for different socioeconomic settings.

Fourth, AID should acquire experts from LDCs to assist in problem-solving evaluation.

Finally, the next group is related to specific development programs to projects. One, use the beneficiary group input to assist in program design. Also perhaps make use of third country nationals.

Two, design projects so that perceived risk, especially economic risk, to beneficiary groups is minimized.

Three, increase sensitivity to the goals of host country governments to decrease the possibility of conflict. This is something you do all the time, of course, to decrease the possibility of conflict between project teams and national leadership.

And four, design projects with least change in existing social patterns so that the rate of change will be slow and within the framework of existing ideology systems.

Bokhari: Technical, environmental and social aspects--according to my general knowledge it is very difficult to separate these areas when you are dealing with the development of a country.

My first comment is that I appreciate whatever efforts we have made collectively. If AID is honestly prepared to implement what has been said here, its budget will be four times the present budget. They have to take care of this factor.

Second, the cost of production per unit of development in the developing country will increase by at least six times the present rate.

Number three, it is very easy to talk about interaction of social, economic and environmental aspects of a given setting, but it is very difficult to analyze all three elements in any given situation whether in a developed or a developing country, particularly in our setting.

We have to ask for aid and loans from AID, from the World Bank, from the United Nations, from Asian banks and many other sources. Each one carries its own agency biases, its own expert biases, its own standards and its own elements. There is no standardization of approach. So what happens is that we are left looking in six directions while preparing our development programs. We prepare one development program to be sponsored by the Asian bank. We somehow don't get the aid or loan. We offer it to AID and it is rejected straight away. Something has to be done concerning this problem by all lending agencies together.

The other difficulty that concerns us is that Washington policy is different from individual policies of your own agencies in our country. We prepare a program on the basis of the previous expert and the previous AID agent in our country. When he leaves a new person comes and the whole program is changed. We are already poor, not only in finances, but in our technical know-how, in our implementation capabilities. It is a great drain on our resources to change from agency to agency from day to day. These factors must be considered while AID studies are being designed.

The other point concerns social aspects. Whatever social science literature is produced in America I try to read. I find that the most important questions today are: "What are acceptable standards under different socioeconomic settings?" What are the different starting points. What are the devices to measure the change in the social-economic or social-cultural aspects. Unless these standards are fixed I'm afraid foggy policies are likely to be a deterrent to development, rather than enhance progress. So we must move quickly to standardize policies and introduce the indices both in the developed and the developing countries so that there are no two opinions about measuring these impacts.

Comment: We've obviously moved a bit away from a narrow discussion of social factors. We might ask some of our other visitors to comment in a similar vein as well as to discuss the social factors.

Basku: The underlying point we all bear in mind in LDCs is that natural resources development is undertaken to improve the social and economic conditions. As long as natural resources development is done in a way that the LDC feels it is giving them away, especially nonrenewable resources, there will be friction and suspicion. Forget about the appearance of the whole process. But, let's not forget that all of these LDCs are very impatient about developing. They have television, newspapers and movies. They see what is going on in the world. In the backward regions of Africa, or Latin America or Asia people are impatient to develop. And all these hurdles are sometimes the cause of some concerns to the people.

Please also consider these scenarios. AID goes to the country where highways are being built, perhaps with some AID financing. AID requires some major land redistribution, employment and agrarian reform and other similar changes. In some countries that may be taken as almost socialist. Who is AID to try to tell us how we should develop socially and economically and to become involved in land tenancy? On the other hand, as Dr. Bokhari very well expressed, there are countries which might have a very progressive and socialist economy where perhaps the AID contingent are very conservative and fall way short of what the country expects.

The socioeconomic conservation of natural resources is the key to all programs. Data banks, remote sensing and technology are simply instruments to achieve an objective of our country. But, I think it is not the intent of this conference to discuss political, economic and social strategies or how AID can help to promote balanced development in the world.

I have certain thoughts about your very difficult role. I have some understanding of the problems that you face in such a wide range of countries with different political systems and motivations.

APPENDIX III:

Rejoinder Session

REJOINDER SESSION

March 24, 1976

W. G. Matlock:

This session was designed to give the authors of the two scoping papers an opportunity to present rejoinders, but I find, after listening to the discussions during the last two days, that it is probably inappropriate for me to attempt to do so. Nevertheless, some comments I am about to make may give some structure to the discussions so that we can recall the focus of the conference, namely on certain gaps, issues and barriers. In our introductory paper, we tried specifically to point out what natural resources are and what we ought to be considering. In retrospect, it seems to me that in a realistic way, the conference has fairly well covered the battlefield of resources as we presented them. We attempted to focus discussions by identifying issues that were of particular concern to us, topics that we hoped that you in your deliberations would consider also. First of all we pointed out that there are physical issues in natural resoure development. Primary among the physical issues was the idea of assessment. It has been encouraging to me to note in all discussions this has been a matter of concern. We recognize that it's area wherein we will never have complete data because of limited budgets, limited personnel and access to particular regions.

Then we identified the technical issues. The participants here in the conference have discussed the problems of technology transfer, the problems of education and certainly we spent a good deal of time on the area of technology itself.

The third issue that we raised is the issue of time. If there is any area that I'm not quite satisfied with in terms of conference participation it is the problem that time causes in natural resource development, both in terms of time required to carry out projects as well as time to assess the effects of the projects. In several of your groups, you did mention the conflict between short-term and long-term gains, but this is only one phase of the time issue.

The fourth issue was that of economics. In resource development there has been recognition that most natural resource projects are costly, frequently involving substantial capital investments. Capital is a limiting factor in arriving at successful resource development projects.

Finally, the issue we raised last was the issue of social and governmental problems. Again you'll detect an overlap here because one of the items that was discussed so thoroughly and presented to us just a few moments ago was the issue of society and government in natural resource development.

One issue in government that we discussed here concerned the capability of the governments to do the various things that we as donors attempt to stipulate as a condition of assistance. I particularly appreciate the comments of some

of the people from other countries pointing out to us the need to recognize their governmental restraints and constraints to natural resource projects.

We spent enough time discussing creativity during the initial presentation of the scoping paper, and as a result of our activities during this rather short conference we have had an opportunity to exercise some creativity.

Berry: Remember Henry Arnold's opening half hour showing us the concept of the AID mission these days. I saw in the necessity of this meeting a changed message from Congress to AID about development programs during the last few years. There is an evolution in the pattern of thinking within AID/Washington and to some degree within the missions about styles and objectives of development. Part of that is moving from a familiar process focused on projects, often large capital-intensive projects--building of roads, putting money into irrigation schemes, for example. Money put into infrastructure has been a part of AID's history. That's an activity which at the time we thought most appropriate and very worthwhile.

Now we are moving to a stage, often in response to messages from LDCs, where we have to concentrate on the harder task of undertaking developments that directly affect larger groups of people. That means in many cases some change of emphasis from projects which tend to be capital-intensive and technology-intensive to projects and activities that probably are fuzzier in many economists' and technologists' minds. Part of the emphasis is concern with social conditions. How do you get development benefits to the mass of people rather than to small growth sectors? I think there is a general consensus that the big projects often tend to have dubious results, at least in the short run, and the trickle down of effects, the spread, is much lower than we anticipated.

The role of women is an important issue that we haven't gotten to. Think of rural areas, of the economic life-style of many rural areas. Part of our problem has been that many agriculture extension messages to the rural sector have been aimed at males, although in some countries much of the agrarian decision-making is not in their hands.

One of the reasons we haven't grappled with social issues in natural resource development in a useful way is because of the nature of the conference. We are dealing with pre-strategy, where there is a mosaic of concerns, even within one continent such as Africa. Certainly between three and four continents tasks are so diverse that we can't begin to grapple with them.

AID ought to consider how to get people in the AID process who are not specialists-experts. I tend to resist solving a problem by consulting experts. Personal experience tells me that the operational style of the individual is as important as his or her field of expertise. If we are to communicate in different and broader ways with people and to consider cultural issues there are concomitant implications about the composition of AID--the thinking within AID. As one looks at the historical pattern, economists, range managers, engineers

and other specialists have been the most appropriate people for many activities. It may well be that from this point forward those people still will be needed, but in cooperative efforts with people with other sets of expertise. The group hasn't addressed this question yet.

Some comments about our discussions on technology relate to personal reactions to them. I found little to argue with in terms of some of the issues I had raised in my paper and the way the discussion had gone in that group. I felt that we had not moved yet from a discussion of technology in general to some of the specific issues which arise if you begin to break down our field of natural resources into some of its component parts.

Think about issues regarding forest products, for example, or issues regarding fuel supply to rural and urban people in many LDCs, issues regarding fisheries, issues regarding water. There is one topic which we addressed quite nicely and that is how do we look at our bag of technologies and select that part of the spectrum which is appropriate to certain kinds of activities.

What we haven't thought about is a little more fundamental. And that is in some countries charcoal is going to be a major fuel for some time. Does that mean that we have to stick with the present methods of using charcoal in that particular country for 20 or 30 years? Or should there be some thought or research both here and there on more effective and safe ways of using charcoal in houses or backyards? Can we develop a better stove for charcoal use?

The good, old water pump is a requirement for raising health standards and changing work patterns in most LDC rural areas. But we still haven't developed a cheap water pump that is robust, that deals with dusty conditions, that needs minimum service, that is fitted for use in all kinds of areas. It's not that we can't do it. I know a lot of money was invested to develop a pump to a certain level, but somehow it never got passed on from the experimental stage to the production stage to the diffusion stage. I hope that I'm wrong about the water pump but my experience says I'm not. Are there technologies that we or LDCs should be thinking about based on their current use of natural resources and how to use them over a 10- to 20-year period?

We had a healthy discussion this morning on the environmental issue. It seemed that what we were trying to say, and what the Asia Bureau was telling us, was that the issues were important ones but that the style of operation was equally important. I would vote against having an environmental impact requirement for small projects if it were tacked on at the end and if it were treated by the mission as simply another bureaucratic requirement. If, however, we can turn it around and internalize the concept of environmental impact assessments into project preparation and data planning that is a very important step forward. We are dealing with people at AID project level who are basically economists who do quite well in designing a project in terms of its cost effectiveness.

People don't think spatially. What we are really asking for, and it's a big "ask" is a different pattern of thinking and a different style of operation in all of

our program activity. We won't be too discouraged by short-term negative responses as long as we understand that the problems are real and fundamental, that we're not addressing a bureaucratic problem but a fundamental problem.

Let me give you an example. In Tanzania the party Tanu, the movement to independence started with soil conservation problems. It was rallying point in the rural areas. The British administration set up some rather esoteric requirements for soil conservation--a lot of terracing and other techniques which the farmers rightly judged not productive. The terracing was on rather steep slopes. It stopped soil erosion but it also brought some poor soil to the surface. Those terraces didn't grow anything. Soil is conserved but there's no crop. So, the party was born and got moving.

During the first few years of independence the last thing the new government was going to concentrate on was soil conservation. We had some serious misgivings in about 1966 beginning a broad study of the scientific facts about soil deterioration because it was still a relatively hot issue. It was a four-year study. By the time the final report was published, but before anyone had read it, there was a party manifesto which said, "These are among our more serious problems: conservation of resources, preservation of productivity," etc. Our report came out with a forward from the minister of economic development. There are, then, short-run political issues which become and which have to be borne. In time the problems themselves surface and demand environmental assessment. We have to have the data and be ahead of that.

Over a period of time we have to promote new patterns of thinking. It involves internal education within AID. It involves dialog with LDCs. And it involves hard-headed assessment of what we are doing. Somehow we have to get new patterns of thinking within bureaucratic frameworks. It has been done in many fields. I think this is an important one in which we should press on.

Parham: I have the advantage of being new with AID so I've learned a great deal about my own organization, about what other people think AID is, how they sectionalize AID mechanisms and worldwide concerns. One of the gentlemen sitting up here this morning said that we've got to think about changes that will occur in LDCs in the next 50 to 100 years. There are going to be major changes and I agree.

I will comment in relation to the magnitude of these changes. I'm a geologist and look at time somewhat differently than someone else might. About 10,000 years ago glaciers covered large parts of the world. They went away. About that time the world's population started to increase. It has increased until today when we have between 3.5 and 4 billion. Over that period of time people have developed the environmental concerns that we are discussing here today. Now, the best calculations are that in the next 30 to 35 years we're going to have twice that many people. The faces of countries, the developing as well as the developed, are going to change. There is absolutely no doubt about that. According to the World Almanac, there was only one city in the world that had a population greater

than 1 million in 1800. By 1900 there were 12. That's not a great increase. But by 1976 there were 146. Look between the tropics of Cancer and Capricorn: in 1900 there were no cities of 1 million population. Today there are 30. The point I want to make is that I think population has not been considered enough in many of these issues during the past couple of days.

Leonard Berry and Ambassador Silva both have pointed out that these are global problems. We are not trying to put the burden on one particular people.

Long: Look at the development of U. S. foreign assistance and it can be seen we've gone through a number of phases. During the time of the Marshall Plan we talked in terms of big projects--rebuilding cities and countries overnight. We soon found that when we went outside of the cultures we were more familiar with--Latin America, Africa and Asia--that we couldn't relate effectively and we entered a period of institution building. We trained people in the United States and other places hoping they'd go back to their countries. We then had the time of the brain drain which is still with us. We found that some of the institutions we were physically putting into place in the developing countries weren't functioning. Recently we worry about the outreach of the institutions. We have to get people into the field to make assessments in both the physical and social environments.

AID moves forward with a mandate to work on rural development, the need to mobilize people, to get them out in the field, to make the institutions work and to utilize the women. Technology gives us some tools for doing this. People talk about remote sensing as sophisticated technology. But when a country starts to deal with a technology such as remote sensing the effort revitalizes the agencies. It makes them think, "I have the LANDSAT photographs and I'm going to analyze them. But I have to get ground truth." So that gets people out in the field. Take a relatively sophisticated technology, if you judge it very narrowly it may not make sense, but there are secondary and tertiary benefits in terms of revitalization of which one has to be cognizent.

The U. N. Environment Programme Governing Council is meeting for two weeks into April. This year and next year they are placing particular stress on environment and development. I have some background papers that trace the history of environment-development issues first articulated shortly before Stockholm. Many of these issues are still with us, of course. Distinction is made between environmental problems associated with developed countries from overabundance and overconsumption on one hand, and those associated with developing countries related to the fact that the people are forced to develop natural resources in a very limited way because of illiteracy and narrow perceptions of environmental problems, real impediments to progress. If we are going to deal with environmental and developmental issues, it's certainly to the developing country's interest to become more concerned with social equity, improving the quality of life and natural resources. It's good that we have talked about natural resources as a whole. Sometimes we make attempts to segregate,

but you have to consider the mix of resources. That is part of environmental assessment. AID's prime responsibility in one way is the 211(d) grant with the University of Arizona where we research multiple uses of natural resources. It's very difficult and it's challenging. I stress the need to get people out into the field--you can't do this from capital cities. It's very clear.

Finberg: I would suggest that a congressional mandate by its very nature is somewhat arrogant at worst and at best paternalistic. Indeed, we are telling other countries we care about the little man; they may not care about him as much as they should, but we do.

And employment--we know something about insuring that. In many countries it is true that it's a different situation entirely. They are concerned with participation by the base groups in concepts completely different from our own. They are concerned with equity. But, they still need foreign exchange, they still need the infrastructure, they still need the dam, and this is something we know how to do. But it's the very thing we're enjoined from doing by the congressional mandate.

Berry: On the other hand, in building some of the dams we have run into major problems. I think we still have to consider seriously a whole range of failures to reach optimum goals in these projects. We were thinking of transferring technology to people which we did fairly well. But we don't have enough knowledge about the different environments in which we are using that technology. The United States, World Bank and other donors have not given enough lead time to LDCs to develop management skills and all those other social aspects.

Bokhari: Has intermediate technology been tried anywhere? Is it available anywhere? The answers are yes. Before I give some information I would like to give some background.

In Pakistan a big program was launched some time ago regarding salinity control and reclamation planning. In that program water usable for irrigation purposes was determined on some absolutely hypothetical basis. The standards ultimately established could not be adopted even in America under the best possible land and water management conditions. Even if the farmer was a graduate of agricultural engineering, even if he had a big farm with complete mechanization, even if he had complete control over finances needed for chemical amendments required to improve his soil he could not use the water considered usable in Pakistan. We cannot adopt water-quality criteria hypothetically. We have to correlate water-quality criteria to existing management with flexibility to improve it if farm management technology improves.

Previous design was based on belief that the farmer automatically will change his methodology, that government policies automatically will be changed, that land conservation will take place, that small farm packets will become bigger, that farmers will adopt mechanization, that farmers will have irrigation ditches like those in the United States which carry five to six feet of water; but it did not happen.

So now new, intermediate technology has been adopted. What is that? According to this technology the water quality standards have been reduced to the level of USDA Handbook 60. That gives very reasonable water quality standards in view of conditions obtainable in Pakistan and many of the developing countries. Experts in America have doubted the validity of the qualities given in their book, but their doubts are based on theoretical conservation rather than practice. We hope that in future reclamation programs, our farmers will be able to make better use of intermediate technology.

A different set of criteria for cost economics and viability of mechanization exist in Australia, in America, in Canada, in other parts of the world. It is said that at least 100-250 acres of farming are required to have full mechanization, sometimes even more. If these criteria are adopted the entire land tenancy system in most developing countries will have to be changed, almost an impossibility unless the system of the government is completely changed.

In view of this difficulty intermediate technologies are available. What are those instruments of intermediate technology? The instruments of technology in this case are akin to those of the Japanese gardening system of agriculture. Using two bullocks for power reduces to the minimum the cost of operation and maintenance. Even a small farmer can afford to have them instead of having a Maxi and Ford and other big tractors of 100 and 200 horsepower. So there are a number of ways in which the intermediate technology is already being practiced, can be practiced. Innovations should happen as much in the developing countries as in the developed countries to improve the interaction between the intermediate technology and our socioeconomic setting. As time passes we should gradually shift to a capital or highly capitalized technology.

Matlock: I'll comment about something Leonard Berry brought up. I have some personal experience with that pump which illustrates one of the problems in technical assistance programs. The idea was good but it never was taken far enough. In other words program continuity was lacking.

I was in the upper region of Ghana and went to a small town there called Garu. Being interested in groundwater I asked them about their groundwater system. They said they had three wells equipped with the AID-designed pump. A contractor was manufacturing the pumps to AID specifications. When I was there none of the three was working. They had been installed within the previous year. Under field conditions there was a problem. The Ghana Water and Sewers Corporation--the agency that was partially involved in the well-drilling project--took the pump into their own shops to make modifications. They have made recommendations for no less than 18 major design changes in that pump as the result of their experience with it in the field. I'm not being critical of either AID or the designer of the pump. I'm being critical of the system. There was not the continuity of program that permitted the pump to be put out and tested under field conditions so that it would be workable in countries for which it was supposedly designed.

Comment: The important part of that statement is that too often the professional man runs the pump in the field. The person who is actually going to run it should be running the field tests.

Matlock: Not just running of it, but maintaining it also.

Comment: Our situation in Central America I understand is very different from that in Africa, Asia or other countries. I would like to stress the importance of the input of local institutions and local people trained in technology and environment. We have been working for years with organizations from the United States and other Latin American countries. What we usually do is define the problems and the technological needs jointly, which I think is a basic factor. Many times we get people from the outside with excellent ideas, but which are often not realistic.

We have tried to educate our own people. We have tried to educate people in other institutions in Central America so they can work jointly with us on technological problems. And we have the continuous problem of educating politicians. Sometimes it's very hard to make people in political positions aware of the need for more technology or of the problems involved in technology transfer. This is not an easy exercise. When dealing with the LDCs where the turnover in politicans is quite rapid this educational exercise becomes one of our major concerns.

We have to make people aware of the problems of the environment. A few years ago we set up a regional seminar which our friend Cruz Matos attended and possibly other people here attended, Mr. Silva for one. The outcome of that was that we could determine some of the most important environmental problems related to agriculture and social development in Central America. It was just a beginning. It was one of the case studies selected by UNEP two years ago because it meets the conditions that Bill Long mentioned this morning of being regional and of worldwide importance. It is concerned with integrated pest control on cotton plantations.

In Central America cotton is one of our major exports. Cotton plantations are along the Pacific coastal plains where we also raise cattle. Pesticides contaminate streams and the shores along the coast where shrimp fishing occurs. We started by controlling some of the contamination in shrimp. Here again is a case when the effort and push was originated locally. It was of enough importance that it was of interest to both UNEP and the National Academy of Sciences.

Matlock: Perhaps I didn't emphasize it sufficiently when I reviewed the social issues group report but that was one of the important points that I felt came out of that session--the need for input from local people both in defining their needs and in helping design development projects.

Comment: One area that hasn't been presented in the conference concerns the difficulties associated with not having input structures associated with technology

transfer to local institutions. I call on my own experiences in Mexico and having been a recipient of AID programs.

The major difficulties we had were with equipment. Generally there were no supporting elements for the equipment for the endeavor to perpetuate. The case I'm specifically referring to was an AID program to develop a research capability. There were technical people like myself to put on the program. We constantly ran into the problem of not having the support elements. We couldn't call up and get equipment or replacement parts. Invariably the equipment that we got was not used properly. Examination of the total system is important.

Jacobs: To reinforce that statement, I have recent experience in trying to get an environmental team project working in the Philippines. We had projected heavy expenses for technical and professional assistance, but the first counter-action from the Philippines was a large request for certain kinds of equipment including transportation. But apart from the transportation problem there were many other types of equipment they felt they needed along with spare parts. It became a large issue. I'm finding instances of this problem in Indonesia too. It comes as a bit of a surprise to those of us who have been concerned with problems of professional and technical manpower to have to consider the problems of equipment.

Brown: Some areas of concern to us in Afghanistan, one of the most primitive of all areas, may not apply in other areas. But we find that after we have trained a person and he or she has a masters degree from a good U. S. or European institution he or she may return but can't work because of the system. The system is so archaic that modern methods can't be used. Everything takes longer, even getting spare parts out of warehouses.

I noticed in our report that multidisciplinary approaches were emphasized as being the most effective way of dealing with these problems. But in a developing country the most difficult undertaking is a multidisciplinary project involving more than one ministry. Getting ministries to cooperate is extremely difficult. In rural development, for example, the president will sign a charter which gives the rural development department under the prime minister broad powers. But he can't execute them. He can't execute his powers because if he did all the line ministries would become angry with him. He would get no cooperation whatsoever.

Culturally these peoples tend to have sequential minds. They will accept irrigation practices and become totally involved but they won't consider drainage. When salting occurs they'll consider drainage but they won't look at water management. When drainage and irrigation have been considered they are ready to look at water management. This multidisciplinary approach is a very difficult cultural problem.

Comment: Have you tried to work with more than one ministry in the United States?

Jacobs: We've been confronted often with this same problem recently. I'll go back to Leonard Berry's statement about experts, technicians or specialists. Somebody with a style of operation should act as a catalyst because an outsider always has a better opportunity in the interdisciplinary sense of getting the various reluctant ministers to work together. We found that they'll listen to us sometimes when they won't listen to their own leader.

Brown: Yes, I sometimes think that of all the concepts the Western World has perpetrated on the rest of the world the ministerial system of government is one of the most difficult. In these areas which have suffered from or benefited from British colonialism ministerial communications problems were all solved by the club. The ministries never communicated directly with each other. But every evening they drank something at the club and did all the business. The system worked around the edges. In many countries there is no real equivalent to the club that allows the ministries to work around the edges. It is not unimportant that this be one of the issues that we address.

Some countries are beginning to use structures which are in the nature of applied research structures, halfway between university and government, that allow access, unthreatening access. In some cases they are set up under the chief executive's office.

I began my career as a geomorphologist with interests in very esoteric things. And now I find that one of my concerns is institutional framework. There are a variety of what one can think of as experiments being tried to break down the ministerial communication barrier. Sometimes a foreign donor may be very helpful in trying to set up structures.

In addition to the actual technical advice that is derived from our collaborative workshop approach is the advantage of several ministries sitting down at the same table with an outside group. The outside group gives them an excuse to arrive at a joint conclusion--joint conclusions between the ministries and the outside group, predominantly U. S. groups in this case. It allows them to save face, if you will, or permits a decision to be made by the president or at the next level down without insulting one of his ministers or ministries. It is really an advantage that shouldn't be overlooked.

Moavenzadeh: We found in trying to develop remote sensing awareness in LDCs that someone coming in from the outside can often be very effective in getting people at least to hear each other where they wouldn't normally have done so, or would have done so with great reluctance on a very limited basis.

Certainly the state-of-art in electronics and related fields of electrical engineering has progressed so rapidly in the last 20 years that a hardware designer assumes a certain environment in which that hardware will operate.

He assumes that there will be at least a regional repair shop, that everybody knows what a transistor is and has a few lying around on the shelf and that when something breaks someone is smart enough to replace it. That's an environment which doesn't appear to be typical in LDCs. Yet that is an environment in which most of the hardware is built and where the market is. So there is a need for a greater awareness of the true conditions on the part of the engineer building hardware even to the point of having the engineer spend some time in the LDC before he ever begins to design.

When I was in engineering school there were two courses in computer programming at the University of Michigan, at that time one of the more progressive institutions and probably still is. Very few students took computer programming. Now everyone does. Students work with very sophisticated third generation computers, time sharing, and individual terminals. Some people don't even go to class anymore. They turn on the computer terminal and receive instructions that way. The process or education in this country has advanced so rapidly that I'm not sure people we train are entirely suitable to go to underdeveloped countries to transfer technology. I think they are not being properly taught.

At the same time there have been new developments in colleges with which I'm personally familiar because my dad works at one where they teach trades and industry. Two-year colleges offer courses like automotive repair, printing, courses of this sort. People are going to those schools and getting good technical training. I don't know if people with that background are being utilized to effect technology transfer, but I certainly think they ought to be.

Comment: You are describing a situation in terms of the engineers who design electronic products for the market in the United States, Europe and Japan. The fact that he goes to the developing countries to see the conditions there isn't going to change his design one iota if the market is not there. That is a fact of life. If you want to tackle the problem you've got to get more at the root of the problem than building the equipment for its own use.

Engel and I have been struggling with training the engineer for a long time. Again, it is a matter of our suggesting to the developing countries that they ought to have more trade schools, a suggestion which brings the whole cultural thing right back at you. If you don't have a four-year degree, you simply are not accepted. The solution, then, may not be in our training them at all, but in building institutions for their own training.

APPENDIX IV:

Summation and Closing Remarks

SUMMATION and CLOSING REMARKS

Seale: The one topic pervasive throughout the discussions, as I perceive it, has been the emphasis on the necessity to develop institutions within LDCs. I see no obstacle to setting up institutions with a matrix of renewable or nonrenewable resources in one direction, and technology-environment-social conditions in the other, if there is sufficient commitment to do so. There is no question that we need them, by which I mean more than universities. Governmental structures too are needed that can respond to the same needs that university-type institutions are built around.

Nevertheless, in many cases such institutions are luxuries, generally available only in developed countries. At least, the availability of people capable of the everyday problems of technology transfer is greater in developed countries. While there are classical universities of long and deep traditions in many LDCs, my conception of the kind of institutions needed is, rather, schools, bureaucracies, agencies, and research institutes. That is where we ultimately have to find our colleagues, though they are not always there.

Out of the discussions this morning, related to environmental impact and how it should be assessed, and how in fact it is being assessed in various field projects, there comes the idea that we should have a conscious differentiation between the environmental assessment of renewable and nonrenewable resource activities. The latter are somewhat transitory, certainly in the geological sense. On the other hand, renewable resources are those that we hope are more permanent. Perhaps there should be, as I understood Mr. Jacobs to say was happening right now, a conscious effort for cost-benefit evaluations of environmental activities as part of the decision-making process.

Recently I had an opportunity to go to a meeting at which an organization with many similar problems, although in a different matrix, was presenting some of its efforts, the Electric Power Research Institute (EPRI), an organization concerned with developing energy resources in this country. One of their problems is that electrical engineering schools have not taught anyone electric power generation for 35 years.

Their strategy is very interesting, and in its development and use there are processes that others might consider. Within their limited budget--limited in comparison with ERDA and many other Federal agencies or equipment manufacturers, they evaluate energy alternatives independent of the level of funding support for those activities. They establish a priority scale completely independent of whether or not that activity is currently funded. At that point they determine where to get the most "bang for the buck," i. e. the most cost-effective application of their resources. They may see a program as being potentially five times as productive as another. If the latter option is funded at 50 times the level of the first one, they may very well put the preponderance of their resources into the potentially less productive program because they will feel it important.

EPRI is a client organization for various utilities. It has turned out to be very effective in cutting down the time between development in the laboratory and implementation by a utility in its business. That involves people transfers and people sharing.

Bloom: In attempting my view of the conference, in a summary sense, I took the stance of a man from Mars sitting in on this meeting trying to recapitulate its meaning. This Martian might have derived four or five recurring themes, such as:

Almost every group that came up with recommendations talked at some point as though there should be in each country and in AID an overall statement of goals or policies or strategies or plans. This has been an almost universal recommendation.

Second, obviously these goals, policies, strategies and plans between LDCs and AID quite likely will not agree in significant respects. If they do not, there is likely to be sub-optimization in an international sense. There are going to be two institutions each with its own purposes deviant in some measure from the other. They are going to work in some measure against one another. Two and two isn't going to make four, it's going to make three point twenty-five or two point thirty-seven.

Third, this sub-optimization is particularly true if planning is done, in this case with respect to AID, by special interest or professional groups. Technologists value technology. Each professional values his profession and wishes to maximize its use in ways that seem appropriate to the particular profession. As the social issues group noted, and I thought very well, the fundamental goal is to develop socioeconomic systems through resource development or through professional development. If that is important, then this--and not technological or professional work per se--is obviously the goal. I think what Bob Seale was saying is that all of us have high professional standards. We carry those standards with us and they have to be continuously questioned.

Fourth, I hear macro ideas, ideas that are relevent to a society or a nation, such as environmental improvement and fuller employment, which tend to be implied in a particular project without sufficient discrimination. It is perfectly possible within an overall strategy designed to maintain or to provide fuller employment, to undertake projects which are capital-intensive. To take a simplistic view that a capital-intensive project is inappropriate to the development of employment opportunities is probably short-sighted. There are all kinds of linkages that may allow capital-intensive projects to generate employment when their total economic and social impacts are known.

Finally, I have observed from this meeting and many others that if ideas are relevant or appropriate and if they are well integrated into the various cultures to which they are applied, they really can be developed outside specific political settings, although they must certainly consider those settings. That is to say that ideas are useful even if they are developed outside the political unit into which they are to be injected provided attention has been given to understanding that unit, probably by involving some of the people in it in the development of these ideas.

Bill Long described a sequence of changes within AID. We are moving on beyond an institutional development stage. It seems to me that what we are getting into now is an idea-generating stage. I am wondering if I do not hear in all this discussion that AID is becoming more an idea agency and less a

money agency, actually forced to do so because its resources are diminished. When we are talking about strategy we are really talking about a strategy which makes ideas rather than institutions central. If this is the case I expect that in this group there are people who have interests that relate to particular countries or geographic areas who are having some trouble with this change in AID because by necessity they have been concerned with developing institutions and people for particular situations and not so much for idea transfer.

In this new sense ideas likely are to become more important than institutions, a change difficult for me to have dealt with. And I suspect it will be a hard one to deal with almost anywhere.

Arnold: We in the United States, in AID, seem to be expecting more of developing countries than we do of our own country--more than we know is available in our own country. We expect multidisciplinary actions and cooperation between ministries in LDCs. As someone pointed out we certainly do not have that available in our own country. We don't even practice this concept to the maximum extent in AID although it is a small organization.

What has caused me some sleepless nights is that we keep talking about searching for the goals of rural populations and being responsive to them. This is so illusory. There is no one set of goals in a country, no one set of values. We have to work through the governments. We say we are being responsive to the needs of the rural people. There is great inconsistency here. We are not consistent in this country. We don't all have the same goals and values.

With regard to the purposes of the conference set out two and half days ago, I think we have not done too badly. I said in the beginning that I would like to get some guidelines, some identification of gaps, barriers and issues. We certainly have identified some issues, and while we have not been quite as specific about gaps in research, we have had much discussion about areas that can be considered for further investigation and research. I feel that I can take home with me some guidelines. When we sit down and think about this a little bit more and when we try to put this in writing in a concise form, these discussions will become even clearer. I believe that we do have a valuable directional base from which we can draw for some time.

To even a greater extent we have accomplished the second purpose of providing an opportunity for people to talk freely and individually. I noticed the difference from the first day in the conversation level, intensity and enthusiasm at the coffee hour today.

We have had the privilege of having a number of people from the University of Arizona share their views with us. I hope they have acquired from us a bit of our philosophy and learned about some of our problems. In that way the university will become a more useful resource from which AID can draw. We really have accomplished three purposes we set forth to accomplish.

A fourth one was the question of testing group interaction methodology. Dave Malone has attempted to give us a methodology in which we could bring out in a short period of time some thoughts triggered by conversations with each other. We have evaluation forms to give you all a chance to say whether or not you think this has been successful or what you think could be done to make this approach more useful. In a short period of time it is very difficult to develop group interaction, especially with a group that hasn't had a chance to be together much before. It seems to me, whether it was due to methodology or sunny weather or the hospitality, that we have experienced more than the average amount of group interaction.

Finally, I extend my thanks to all of you who have shared your time with us, who have shared your thoughts with us, especially to the people from the other countries. Your comments were very much appreciated. You did not try to tell us what you thought we might want to hear; you tried to tell it the way it is. That, of course, was the valuable part. All of you were most faithful in your attendance. I appreciate your straightforward and frank participation. And our thanks finally to the University of Arizona for great hospitality and great hosting.

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APPENDIX V:

Attendees

ATTENDEES AT THE

ANNUAL AID/OST STRATEGY CONFERENCE

THE UNIVERSITY OF ARIZONA

TUCSON

MARCH 21 - 24, 1976

ARNOLD, Henry, Director, Office of Science and Technology, Agency for International Development, Washington, D. C.

AUCHTER, Richard J., Forest Products Laboratory, Forest Service, U.S. Department of Agriculture, Madison, Wisconsin

BAKER, Robert, Associate Professor, Systems and Industrial Engineering Department, University of Arizona

BERRY, Leonard, Professor, Graduate School of Geography, Co-Director, International Development Program, Worcester, Massachusetts

BLACKLEDGE, James P., Associate Director, Denver Research Institute, University of Denver, Denver, Colorado

BLOOM, CLARK, Department Head, Public Administration, University of Arizona

BOKHARI, Syed Manzoor Hussain, General Manager, National Engineering Services of Pakistan, Lahore, Pakistan

BROWN, Vincent W., Mission Director, USAID/Kabul, Afghanistan

BULFIN, Robert L., Assistant Professor, Systems and Industrial Engineering Department, University of Arizona

CARTER, Herbert, Coordinator, Office of Interdisciplinary Programs, University of Arizona

CHANG-NAVARRO, Lorenzo, Department de Recursos de Agua-Tierra, Universidad Nacional Agraria, La Molina, Lima, Peru

CLARK, Robert Emmet, Professor, College of Law, University of Arizona

CLEVELAND, David, Graduate Student, Anthropology Department, University of Arizona

COCKRUM, E. Lendell, Professor, Ecology/Evolutionary Biology, University of Arizona

COX, Milo, Professor, School of Renewable Natural Resources, University of Arizona

CRANCH, Edmund T., Dean, College of Engineering, Cornell University, Ithaca, New York

CROW, John, Associate Professor, Department of Government, University of Arizona

DAVIS, Stanley, Department Head, Hydrology and Water Resources, University of Arizona

DENGO, Gabriel, Director, Central American Research Institute for Industry, (ICAITI), Guatemala City, Guatemala

DETTLOFF, John, Research Associate, Institute of Government Research, University of Arizona

DOYEL, William, Assistant Program Manager for Information Dissemination, Resource and Land Information Program, U.S. Geological Survey, Washington, D.C.

DRESHER, William, Dean, College of Mines, University of Arizona

ENGEL, Julien, Department Director, Board of Science and Technology for International Development, National Academy of Sciences, Washington, D.C.

ESCUDERO, Carlos Alberto, Director, Serren, Universidad de Chile, Santiago, Chile

FARY, JR., Raymond W., U.S. Geological Survey, National Center, Reston, Virginia

FASLA, Marie, Assistant Professor, College of Nursing, University of Arizona

FAZZOLARE, Rocco, Associate Professor, Nuclear Engineering, University of Arizona

FINBERG, Donald, Mission Director, USAID/Lima, Lima, Peru

FISCHER, John L. Coordinator of African Programs Consortium for International Development, Tucson, Arizona

FITZ, Raymond, Associate Professor, Program in Engineering and Public Policy, University of Dayton, Dayton, Ohio

FOSTER, Kennith, Assistant Director, Office of Arid Lands Studies, University of Arizona

GREENWELL, Richard, Assistant to the Director, Office of Arid Lands Studies, University of Arizona

HAASE, Edward, Assistant Professor, Office of Arid Lands Studies, University of Arizona

HAMILTON, David, Center for Improved Education, Battelle Columbus Laboratories, Columbus, Ohio

HAMMOND, Ross W., Director, Economic Development Laboratory, Engineering Experiment Station, Georgia Institute of Technology, Atlanta, Georgia

HIEBERT, Gordon, Program Manager, Office of International Programs, National Science Foundation, Washington, D.C.

INCE, Simon, Professor, Civil Engineering, University of Arizona

INGRAM, Helen, Associate Professor and Director, Institute of Government Research, University of Arizona

JACOBS, Alan, Asia Bureau, U.S. AID, Washington, D.C.

JOHNSON, Jack D. Director, Office of Arid Lands Studies, University of Arizona

KUX, Molly, Office of Science and Technology, U.S. AID, Washington, D.C.

LITTLEWOOD, William H., Associate Director, Office of Science and Technology, U.S. AID, Washington, D. C.

LIZARRAGA-REYES, Jose, Director General, ONERN, Lima, Peru

LONG, Bill, Senior Specialist for Natural Resources, Office of Environmental Affairs, Department of State, Washington, D. C.

MALONE, David, Associate Professor, Center for Technology and Administration, American University, Washington, D.C.

MASTROFINI, Leo, U.S. AID, Washington, D.C.

MATLOCK, W. Gerald, Professor, Soils, Water and Engineering Department, University of Arizona

MATOS, Cruz, Staff Expert, Office of Technical Cooperation, United Nations, Port of Spain, Trinidad

MC CONNELL, Robert, Dean, College of Architecture, University of Arizona

MC CULLOUGH, EDGAR, Department Head, Geosciences, University of Arizona

MC JUNKIN, F. Eugene, Professor, School of Public Health, Department of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, North Carolina

MEYER, Michael, Director, Latin American Center, University of Arizona

MILLER, Hugh H., Executive Secretary, Office of the Foreign Secretary, National Academy of Engineering, Washington, D.C.

MOAVENZADEH, Fred, Professor, Department of Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts

MOUAT, David, Program Director, Applied Remote Sensing Program, Office of Arid Lands Studies, University of Arizona

MUNOZ-CASTRO, Salvador, Latin American Center, University of Arizona

NICHOLS, Andrew, Chairman, Family and Community Medicine, University of Arizona

PARHAM, Walter, Natural Resource Specialist, Office of Science and Technology, U.S. AID, Washington, D.C.

PAYLORE, Patricia, Assistant Director, Office of Arid Lands Studies, University of Arizona

PIERCE, Phillip, U.S. Army Corps of Engineers, Washington, D.C.

RESNICK, Sol, Director, Water Resources Research Center, University of Arizona

RHODES, Herbert, Dean, Graduate College, University of Arizona

SCHULTZ, Donald, Head, Systems and Industrial Engineering, University of Arizona

SEALE, Robert, Head, Nuclear Engineering Department, University of Arizona

SHONYO, David, Foreign Programs Liaison Officer, National Technical Information Service, U.S. Department of Commerce, Washington, D.C.

SILVA, H. E. Rudolfo, Ambassador of Costa Rica, Washington, D.C.

SMITH, Lamar, Associate Professor, School of Natural Resources, University of Arizona

STONE, Ralph, President, Ralph Stone & Company, Inc., Engineers, Los Angeles, California

THOMSON, Frederick J., Research Engineer, Environmental Research Institute of Michigan, Ann Arbor, Michigan

THORUD, David, Director, School of Natural Resources, University of Arizona

VON TEUBER, Eugene, Assistant Director, Latin American Center, University of Arizona

WEBER, Edmund, Research Associate, Office of Arid Lands Studies, University of Arizona

WILLIAMS, Edward, Professor, Political Science, University of Arizona

WYMORE, A. Wayne, Professor, Systems and Industrial Engineering Department, University of Arizona

APPENDIX VI:

Report on a Workshop:
Annual Strategy and Planning Symposium
for USAID/OST
for International Development

A REPORT ON A WORKSHOP:

ANNUAL STRATEGY AND PLANNING SYMPOSIUM FOR THE OFFICE OF SCIENCE AND TECHNOLOGY, U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

Tucson, Arizona
March 21-24, 1976

David W. Malone

Center for Technology and Administration

The American University

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BACKGROUND

The decision was made in late January to utilize structured group interaction processes in the Annual Strategy and Planning Symposium for the Office of Science and Technology, U.S. Agency for International Development, scheduled to be held in Tucson, Arizona, March 21-24, 1976. It was clear that because of funding constraints and prior commitments of the principals, there was inadequate time available to complete arrangements and design the meeting with adequate participation and cooperation from the host organization, The University of Arizona. Nevertheless, it was decided to proceed on the assumption that the potential benefits outweighed the potential problems and to test the conjecture that the introduction of some structure into the tradional workshop procedures would enhance the quality and focus of workshop activities and products.

This report consists of a discussion of the workshop procedures, a review of the feedback obtained from the participants at the end of the workshop, and an assessment and recommendations for the future.

WORKSHOP DESIGN AND EXECUTION

The topic and the participants had been selected in advance and were taken as basic constraints on the workshop design. The two principal goals of the workshop were:

- to produce information for use by AID in developing strategies and plans for assisting the natural resource development programs in LDCs.
- to facilitate both formal and informal interaction and information exchange among the participants

These broad goals were supplemented by the following specific substantive objectives to guide the design of the workshop activities:

-- to generate structured lists of (information) gaps, issues, and barriers to natural resources development;

-- to generate structured lists of alternative approaches or actions for dealing with natural resources development issues; and

-- to generate structured lists of social, environmental, and technical impacts of alternative natural resource development approaches.

Research on individual and group problem solving has shown that greater insight and perception usually arises from individual efforts, but that a greater quantity of good ideas tends to be produced by group activities.* The basic design of the workshop attempted to build upon these findings:

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* Delbecq, et al, Group Techniques for Program Planning, Scott, Foresman, and Co., 1975.

-- Two "scoping" papers were commissioned to provide in-depth statements to initiate group discussions.

-- A sequence of small group activities was programmed to produce the products specified above (the original program is included here as Attachment A).

-- The scoping paper authors were given the opportunity within the context of the workshop activities (see third day, Wednsday, March 24) to provide comments or rejoinders related to the workshop activities.

-- The scoping paper authors were expected to extend and/or revise their papers based on a careful consideration of the group-generated products.

It was expected that the final workshop report would incorporate the group-generated products along with the revised versions of the scoping papers.

Input

The input to the workshop activities consisted of the agenda (Attachment A) and the scoping papers. Because of the timing constraints it was not possible to make the scoping papers available to the participants in advance, but they were available at the workshop.

Participants and Procedures

Attendees at the symposium fell into several categories:

-- Participants
selected in advanced by AID/OST

-- Rapporteurs
selected from AID staff and University of Arizona staff

-- Speakers
especially the three authors of the scoping papers

-- Facilitators
under contract to AID/OST

-- Observers
University of Arizona staff, AID/OST contractors, and other interested persons

Organizational affiliation included:

-- AID staff

-- University of Arizona staff

-- Other university, participants

-- Other organization participants and contractors

-- Other countries, participants (representatives from countries with AID programs)

The original plan was to engage the participants in structured small-group exercises to generate the first two lists ((a) gaps, issues, and barriers, and (b) alternative approaches for development) on the first day, then to generate the third list ((c) impacts) on the third day, going on to generate a cross-impact matrix between the approaches and the impact areas. The three lists were generated, but the cross-impact analysis was not carried out.

Two facilitating techniques (Attachment B) were used on the first day: 1) "brainwriting" was used to generate a large number of ideas in a loosely structured process, primarily intended to orient the participants (serving a "social mixer" function), but also to generate the first product list; 2) "Nominal Group Technique" is a slightly more structured process intended to facilitate the generation and rank ordering of a list of possible actions, in this case "approaches for dealing with natural resource development issues".

It was a part of the original intent in designing the workshop procedures that they be as self-documenting as possible. Rapporteurs were assigned to each small group and it was expected that a minimal amount of effort would be required to propare a prose introduction or interpretation for the group-generated products.

In the original design of the workshop schedule a two-hour lunch break had been scheduled in order to allow the participants to relax after the intellectually wearing interaction activities of the morning. The combination of program slippages and luncheon speakers combined to use up that time, however, and consequently the participants returned to the afternoon activities without having had any unprogrammed relaxation time. By the end of the first day, then, as a result of the tight schedule, the introduction of the new techniques, and the accelerated and focussed participation that these techniques required, the participants had worked probably much harder than they had expected.

As the results of this first day were presented and discussed on the morning of the second day, it appeared that the participants, in general, felt that some interesting results had been obtained, but that further in-depth discussions should be carried out. On the basis of this perception it was decided not to press the group on to the planned schedule, which included the introduction of yet another structuring device (the cross-impact matrix), but to use the remainder of the second day in a modified brainwriting exercise to generate the third output list of impact areas.

The third day of the meeting was then devoted to a plenary session including reports from the second day workshop activities and comments and rejoinders from the authors of the scoping papers.

Output

The final output was the explicit lists generated, each of the three lists consisting of three sublists (one for each of the topical subgroups, as outlined in the schedule in Attachment A), and the information and attitude exchange that occurred among the participants in the course of the structured activities.

PARTICIPANT FEEDBACK

To solicit feedback from the participants regarding the effectiveness of the workshop design and procedures, a brief questionnaire (included here as Attachment C) was distributed to all of those present at the end of the third day. The responses to this questionnaire are presented and interpreted in this section.

In response to a direct question asking for the participants' judgment, regarding the relative effectiveness/ineffectiness of the meeting in meeting its objectives, the results shown in Table I were obtained. Note that the participants were somewhat uncertain as to whether the results of the meeting were of any use to AID decision making (average group response = 5.4, where 5.0 indicates a neutral opinion). (Two respondents did not make judgments here, remarking on their questionnaire that only AID could make this judgment.) As for enhancing group interaction, the participants were much less equivocal, judging that the meeting was at least moderately effective (average response = 6.8).

On examining the breakdown of the responses by affiliation, it is noted that the university representatives and the AID staff judged the effectiveness lower than the other representatives on the first objective. It is interesting to note that both the most intensely involved participants (the rapporteurs) and the least involved (the observers) provided the highest overall responses. (Note also that the rapporteurs subgroup represents a double counting in that the rapporteurs were all either University of Arizona representatives on AID staff.)

Moving to the open-ended questions (2, 3 and 4 on the questionnaire, Attachment C), an interpretation of the participants' responses is assembled

Table I

PARTICIPANT EVALUATION OF THE EFFECTIVENESS OF THE MEETING IN ACHIEVING ITS STATED PURPOSES

Participant Affiliation:	In your opinion, how effective was this meeting in achieving its stated purposes: Very Ineffective 1 2 3 4 5 6 7 8 9 Very Effective	
	a) Providing information to guide AID decisions?	b) Providing an opportunity for effective (formal and/ or informal) communication among the participants?
Observers (4)	6.0	8.0
Rapporteurs (6)	6.0	7.0
Other country representatives (5)	5.6	6.8
Other Organizations (11)	5.4	6.6
University of Arizona (7)	5.3	7.5
AID Staff (6)	5.2	7.5
Other University	4.3	5.7
All Participants, Average	5.4 (N=35)	6.8 (N=37)

in Tables II through IV. The bulk of the positive comments, Table II, tended to deal with the interaction and information exchange categories. This observation is consistent with the effectiveness rating presented in the previous table. A significant number of the positive responses (approximately 20%) made explicit reference to the brainwriting technique or implicit reference to the effectiveness of the participatory methodology.

The negative responses, Table III, were not quite as sharply focussed as were the positive. They did seem to fall into three categories, roughly equivalent to preparation (or input), procedural problems, and quality of results (output).

The individual suggestions for improvements, summarized on Table IV, tended to follow the pattern of removing or dealing with the negative aspects identified in the previous response.

In summary, the participant response seems to come down to recommending that:

a) the goals and objectives be more clearly stated,

b) more time and effort be spend in preparing for the meeting, and specifically in informing the participants ahead of time regarding <u>both</u> the content and the procedures,

c) more time be programmed within the process to allow more in-depth discussions.

Table II

MOST FREQUENTLY CITED POSITIVE COMMENTS

Information exchange

- Learning about AID programs
- Learning about LDC attitudes and problems
- Informal exchange of ideas
- Group discussions

Interaction

- Interaction of diverse groups
- Meeting other participants
- Group discussions

Methodology

- New way of generating ideas (Brainwriting)
- A lot of information generated in a short time
- Everyone had to participate

Table III

MOST FREQUENTLY CITED NEGATIVE COMMENTS

Preparation

Inexact goals

Not enough representation from others involved in natural resources, e.g., agriculture

Facilitators not sufficiently aware of substance

Uneven quality of various sessions (not all facilitotrs had adequate facility)

Reasons for wanting to use new techniques were not clear until second day

Inadequate preparation of technical background

Procedural problems

Pace too fast

Not enough time

Too long a schedule first day

Early frustration because reasons for wanting to use new techniques were not clear until second day

Groups strayed from assignment

Talks at lunch

Quality of results

Generality of group discussions

The results could have been brought to the meeting

Results from exercises were platitudes and cliches (not orginal ideas)

Superficiality (lack of depth because of time and procedural constraints)

Uneven quality of various sessions

Table IV

SUGGESTIONS

Better preparation

- Describe the method prior to meeting
- Improve participant representation (better balance)
- More pre-organization
- Make scoping or background papers available in advance
- Base needs to be more explicitly laid
- More precise goals for meeting
- More precise questions/issues for discussions
- Teach methods to people knowledgeable in substance

Procedural suggestions

- More time to work to specific issues (slower pace)
- More group interaction
- Summary feedback to participants (more time for discussion)
- More specific guidance during process
- Need more short breaks
- Discussions need to be more carefully structured
- More time for small group verbal interaction
- Role of facilitator should be somewhat less overwhelming

ASSESSMENT AND RECOMMENDATIONS

As mentioned in the introductory remarks, it was understood at the outset that the meeting design and execution would be carried out under less than ideal conditions of communication and coordination among the various principals involved. In one sense, much of the participant feedback tended to confirm some of the problems that were anticipated.

On the other hand, some interesting "new" insights were also generated. After some understandable early anxieties regarding the unknown, by and large the participants tended to accept the two specific group facilitating techniques that were used. It also seemed clear from one ad hoc experience generated outside the scheduled activities that the presence of a facilitator is probably essential for the effective utilization of such techniques. It is simply too easy to slip into the old conversational, one-person-at-a-time mode of interaction if the leader or chairman is a concerned and involved participant.

Questions of timing and procedure seemed also to be clarified by the experiences of this meeting. It is probably reasonable to introduce only one or two new ideas to a group of this size at such a meeting. Objectives and expectations for output from such activities should be adjusted accordingly. The trade-off in this case can probably be identified as getting either three mediocre lists or one fairly good list.

On balance, it seems to this observer that the introduction of structured group interaction techniques was a "qualified" success. I would expect this same group to be much more efficient in applying these same techniques in the future; much as they seemed to be more efficient on the second day, having overcome some of their anxieties. Further,

having come this far it might be possible to introduce some of the other more powerful organizing techniques at some time in the future, at least with volunteer subgroups.

All of this suggests that the planning for the next year's meeting might begin almost immediately and be carried out as an integral part of routine OST activities.

Attachment A

BRIEF DESCRIPTION OF TWO FACILITATING STRATEGIES FOR USE IN TASK-ORIENTED SMALL GROUP ACTIVITIES

1. NAME	Brainwriting Pool.
2. CAPSULE DESCRIPTION	Brainwriting pool is a method for generating ideas about some question within a small group.
3. TYPICAL PRODUCT OR RESULT	The product is a list of ideas about the question, possible answers, comments, etc.
4. INTERMEDIATE RESULTS	Each member sees the ideas of other members, and each member contributes his own ideas.
5. NUMBER OF PEOPLE INVOLVED	Minimum: At least four people. Maximum: Any number of groups can work in parallel if sufficient facilities are available, but no more than eight should work in any one group.
6. FACILITIES REQUIRED	Each group needs a table that will accommodate up to eight. Standard size paper and pencils are needed. Optional use of a large pad or blackboard for displaying results to all members is often desirable, but is not necessary.
7. TIME REQUIRED	Minimum: Four people working 15 minutes, for a total of 1 man-hour. Maximum: With optional discussion allowed, 2N man-hours, where N is the number of participants.
8. COST (excluding travel)	Minimum: About $50. Maximum: $60 x N, where N is the number of participants.
9. APPROPRIATE CONDITIONS FOR USE	Use whenever there is a need for quite a few ideas about some question, and it is appropriate to obtain these from a number of individuals working together at one location.

10. OUTLINE OF METHODOLOGY, PROCESS, TECHNIQUE, ETC

A. Formulate the question to which the group is to respond.

B. Gather the group around a table, or split into several groups as indicated above.

C. There is no conversation during the process.

D. Each person writes a few ideas on a page, then puts his page in the pool, and draws another partially-filled page from the pool.

E. After reading what is written on the page from the pool, the person writes additional ideas on the page and returns it to the pool.

F. The process continues until each member has read everything in the pool and has no further ideas to contribute.

G. (This and succeeding steps are optional.) If there are several groups, the product of each group is given to another group.

H. Each group edits the product of another group to eliminate redundancy and improve clarity.

I. Each group presents to a plenary session their version of what another group produced.

J. Discussion follows for clarification.

11. PERSONS FAMILIAR WITH METHODOLOGY, PROCESS, TECHNIQUE, ETC

Horst Geschka, Battelle-Frankfurt
David Malone, J. D. Gammell,
Gladys Johnson, J. N. Warfield of
Battelle-Columbus.

12. REFERENCES

A. Van de Ven and A. L. Delbecq, "Nominal and Interacting Group Processes for Committee Decision-Making Effectiveness", Journal of the Academy of Management.

13. EXAMPLES OF USE

A. Meeting of Central Ohio Transit Authority Board, fall, 1974, to generate list of possible objectives for the Authority.

B. American Management Association Senior Management Program, fall, 1974, to generate ideas for motivating successful young executives.

C. Academy for Contemporary Problems Urban Leadership Roundtable, to generate potential ingredients of national growth policy.

Nominal Group Technique (NGT)

DESCRIPTION: NGT is a structured group meeting in which silent individual activity ("nominal" group) for generating ideas is alternated with the usual "interacting" group activity for discussion and clarification of ideas:

A. Formulate question(s) to which the group is to respond.

B. Gather participants into groups of 8-12 or less (down to 4) with writing facilities at hand. (The balance assumes one group. The process is somewhat flexible.)

C. Require each person for a specified period to write ideas on a page. Allow no exchange of ideas or discussion.

D. Collect the ideas and list them at random on flip charts or blackboard. This can be done in round-robin fashion, by having each participant in turn read off one of his ideas, or if anonymity is desired, an independent "facilitator" team can take the suggested ideas, list them at random on flip charts and present the results to the group.

E. Discuss ideas for clarification and understanding only for a specified time.

F. Have each person on paper vote to rank ideas. Collect votes and mark consensus on flip charts.

G. Discuss voted rankings and ideas listed for a specified time. Permit limited debate.

H. Vote again on rankings. Collect votes and correct ranking.

For cross-functional priority setting, the idea generation activity of this technique could be used to establish "criteria", which could then be considered when voting on a previously established set of projects.

REFERENCES:

Delbecq, A. L., A. H. Van de Ven, and D. H. Gustafson, Group Techniques for Program Planning, A Guide to Nominal Group and Delphi Processes, Scott, Foresman, and Company, 1975.

Van De Ven, A. H., and A. L. Delbecq, "A Group Process Model for Problem Identification and Program Planning", Journal of Applied Behavioral Science, Vol. 7, No. 4.

Attachment B

PARTICIPANT FEEDBACK INSTRUMENT

AID PRE-STRATEGY MEETING
FOR ENVIRONMENT AND NATURAL RESOURCES DEVELOPMENT

Participant Evaluation and Feedback

1) In your opinion, how effective was this meeting in achieving its stated purposes:

   a) Providing information to guide AID decisions?

   Very Ineffective ——|——|——|——| Very Effective

   b) Providing an oportunity for effective (formal and/or informal) communication among the participants?

   Very Ineffective ——|——|——|——| Very Effective

2) What was the most positive (or most useful) aspect of this meeting for you?

3) What was the most negative (or least useful) aspect of this meeting for you?

4) Do you have any suggestions for improving the format or conduct of this meeting in the future?

5) Please identify your role in this meeting and your affiliation.

Role (check one)	Affiliation (check one)
Participant _____	AID staff _____
Rapporteur _____	Other country _____
Speaker _____	U. of Arizona _____
Observer _____	Other university _____
	Other organization _____